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Monterey, California

THESIS

CONTRACTING INITIATIVES TO OBTAIN
COMMERCIAL AIR CARGO SERVICE ALTERNATIVES
TO THE NAVY QUICK TRANSPORTATION SYSTEM

by

Arthur D. Holden

and

Charles J. Weber

December 1983

Thesis Advisors: Dan C. Boger and Dean C. Guyer

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Contracting Initatives to Obtain Commercial Air Cargo Service Alternatives to the Navy Quick Transportation System

by

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requirements for the degree of

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ABSTRACT

Since 1950 the Navy has moved its high-priority cargo through its Quick Transportation System (QUICKTRANS). This study examines the development of that system and the concurrent growth of the commercial air cargo industry. The authors selected Emery Worldwide as a representative of the commercial air cargo industry and compared its capabilities with the QUICKTRANS system requirements. The authors conclude that the commercial system represents an effective and cost efficient alternative to QUICKTRANS. Several preliminary objectives which must be satisified in order to facilitate a shift to a commercial system alternative are identified and a contracting plan to meet those objectives is presented.

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I. INTRODUCTION

A. GENERAL

The Navy's high priority cargo airlift service was instituted in 1950 because there were no commercial air carriers available that could provide the type of service required by the Navy to specific destinations. During the thirty-three years which have elapsed since this airlift service began, and particularly during the last five years, the commercial air cargo industry has matured to the point where it now offers a complete line of services which can be tailored to meet the needs of its commercial customers. This raises the possibility that the commercial air cargo industry can now fulfill the Navy's need for high priority cargo air transportation.

Since implementation of the Office of Management and Budget (OMB) Circular A-76 [Ref. 1], the Armed Services Procurement Regulations (ASPR) [Ref. 2], and the Airline Deregulation Act [Ref. 3] the Federal Government has been placing emphasis on both contracting out services to commercial activities and enhancing competition. The Navy, however, has continued its contracts for a dedicated high priority air cargo and truck system when commercially utilized alternatives appear to be available. This action does not appear to be in alignment with either the intent or the provisions of current federal directives in the areas of federal contracting or air transportation management. In order to resolve this perceived discrepancy, can the Navy accomodate the intent and provisions of the previously mentioned federal mandates and still satisfy its air transportation needs by more fully utilizing innovative

contracting to encourage tailored services and competitive bidding by commercial activities?

B. OBJECTIVES

The objectives of this thesis are to determine if available domestic commercial air cargo services exist which could displace the existing Navy dedicated QUICKTRANS system and, if so, to recommend contracting initatives which could induce air cargo carriers to competitively bid for the contracts and provide the services required by the Navy at a price which would be mutually beneficial.

C. RESEARCH QUESTIONS

Given the aforementioned objectives, the following primary research question was postulated:

Does a viable, readily available domestic commercial air cargo carrier exist which could augment or replace the Navy's QUICKTRANS system given the present Navy criteria for its domestic airlift services?

The following secondary questions were considered pertinent in addressing this research question.

1. Why and how did the Navy's QUICKTRANS system evolve and develop from its inception?
2. How has the commercial air cargo industry concomitantly evolved and developed?
3. What are the user, management, and contracting requirements for the QUICKTRANS system?
4. What services, assets, and rate structures do the current domestic commercial air cargo carriers have to offer?
5. Are these services, assets, and rate structures compatible with the needs of the Navy?

6. Can innovative contracting induce the commercial air cargo carriers to conform to the Navy's requirements for domestic airlift services?

D. SCOPE

The scope of this study is limited to a systems analysis of both the Navy's QUICKTRANS system and existing commercial air cargo carriers to ascertain their strengths and weaknesses as well as their similarities and differences. Additionally, the study includes the exploration of contracting concepts and practices which might alleviate the existing differences between the Navy's present system and commercial alternatives and the perceived weaknesses within the the commercial systems. The intent of this thesis is to identify existing commercial air carrier alternatives which can displace the QUICKTRANS system in its domestic air service role and be more responsive to the needs of the Navy.

E. ASSUMPTIONS

Throughout this study, it is assumed that the reader is generally familiar with standard Department of Defense contracting terminology, procedures, and concepts; air transportation management classifications and terminology; and Department of the Navy policy and procedures for the transportation of air cargo.

F. METHODOLOGY

The research methodology utilized in development of this thesis consisted of a comprehensive review of literature, and the use of telephone and personal interviews with government and air cargo industry contracting and transportation specialists.

The literature was acquired through the Naval Postgraduate School library, Defense Logistics Studies Information Exchange, Air University Library, and service guides and rate tariffs provided by air carriers. Telephone and personal interviews were conducted with program managers and contracting personnel at the Navy Material Transportation Office, Military Airlift Command, Military Traffic Management Command, Naval Supply Systems Command and the various air cargo companies discussed in Chapter IV.

Additional data were obtained from current contracting and air transportation instructions, regulations, contracts and the files and records of the Naval Material Transportation Office.

G. ORGANIZATION

This thesis consists of nine chapters. Chapter II gives the historical perspective of the concurrent evolution and development of the Navy's QUICKTRANS system and the commerical air cargo industry. Chapter III provides a discussion of the criteria and practices currently utilized in the development of QUICKTRANS contracts and the methods and techniques employed in the award of those contracts. Chapter IV contains discussions of existing airlift alternatives within the domestic commercial air cargo industry. Chapter V is an analysis of the similarities and differences between QUICKTRANS and available commercial alternatives. Chapter VI contains the development of cost and effectiveness models and provides an analysis of research data employing the cost and effectiveness models. Chapter VII provides contracting techniques and innovations designed to alleviate incompatibilities between the systems and to achieve specified performance and cost requirements. Finally, Chapter VIII integrates the contract criteria,

analysis results, and contracting techniques into conclusions and recommendations.

II. HISTORICAL BACKGROUND

To fully comprehend the underlying rationale for the Navy's dedicated air cargo system, one must begin at the birth of the air cargo industry and compare its evolutionary development with the requirement-based development of the Navy system. The following sections provide the historical data necessary for such a comparison.

A. U. S. DOMESTIC AIRFREIGHT INDUSTRY

Although cargo has been carried by aircraft since the birth of aviation it was not until December, 1940 that the first all-cargo service was offered. In that year United Air Lines instituted all-cargo service between New York and Chicago.

> "It was World War II that provided a tremendous impetus to the air-cargo industry. The air transport service generated more traffic from 1942 to 1945 than all the commercial traffic through 1945." [Ref. 4]

After World War II a number of ex-servicemen purchased military surplus aircraft and acted as supplemental carriers (under Section 292.5 of the economic regulations of the Civil Aeronautics Board).

These new supplemental carriers then applied for certificates of convenience and necessity to offer scheduled air freight service and immediately met stiff resistance from the certified dual-service airlines who objected on the grounds that the all-cargo carriers would take business from their operations. The Civil Aeronautics Board (CAB) did not agree and authorized the non-certified carriers to operate in January, 1947. The certified carriers retaliated with a

rate war which resulted in only six of the original fourteen all-cargo carriers remaining solvent by the end of 1947. In July, 1948 the CAB attempted to protect the all-cargo carriers by establishing minimum rates which applied to all air carriers.

By July, 1949 the CAB issued five year certificates on an experimental basis for scheduled all-cargo operations to four carriers. Certified air lines again protested that these all-cargo operations were not necessary since the certified air lines experienced excess capacity since 1945.

> "The CAB was convinced that these new carriers would introduce new methods and managerial improvements in their business and would also provide a valuable yardstick to monitor the efficiency of other carriers of air freight." [Ref. 5]

During the same period of time the CAB established a classification of indirect air carriers to fill the gap between air express (the priority air movement of cargo) and air freight services (the movement of cargo through scheduled operations). These indirect carriers were designated as air freight forwarders and functioned as the consolidators of small shipments of air cargo by air carriers who were licensed but not regulated by the CAB.

In 1954 the CAB renewed the two remaining all-cargo carriers' certificates for five more years (after they were denied the authority to merge the previous year and despite their poor performance). The CAB approved a deferred rate service for use of available space at 55 percent of the minimum rate set for 1956. This was the CAB's attempt to fill unused capacity.

By 1961 the CAB removed the minimum rate requirements which were set in 1948. This was due to stability in the industry, increases in air freight utilization and forecasted increases in demand. Yet, in 1964, the air-cargo

industry was still considered the noisy fledgling of American transportation. "In the pursuit of profitability in the jet age, lines are also going all out to automate and spread critical ground operations." [Ref. 6] During this period air freight carriers began trying new concepts, such as, customer choice of service (overnight, three day or five day delivery, etc.). They also recognized the jet service aspect. The president of Emery Air Freight stated:

> "When a (jet) freighter comes on a route it increases reliability of the service. It brings in people who might have used air freight before and found the service inadequate." [Ref. 7]

By 1970 the first steps toward deregulation were taken. The CAB started its domestic air freight rate investigation which lasted for seven years. It investigated rate levels, rate structures and tariff rules. By April, 1975 an administrative law judge made the decision that air freight rates should be cost-based for each class of traffic. Any existing rates which did not meet the criteria were declared unlawful. The CAB concurred.

In 1974 Senator Kennedy initiated a comprehensive review of CAB policies and practices and found evidence of over-regulation which was supported by air freighters, both all-cargo and dual service carriers. Federal Express voiced concern over not being able to operate larger aircraft because of the CAB regulations on commuter air carriers. Flying Tiger Airlines indicated the need for widespread geographic coverage, overnight delivery, size and weight flexibility, door-to-door service, route and rate flexibility, and single carrier responsibility.

On November 9, 1977 the Domestic All-Cargo Deregulation Section of Public Law 95-163 was enacted. This opened competition in the domestic market, eliminated CAB control

over entry and exit in the industry, and curtailed the CAB's jurisdiction over air freight rates. Since deregulation, air freight service has rapidly expanded. Its real benefits appear to be the availability of a wide variety of services and price options.

Since deregulation, overnight delivery not only has become an increasingly important service, but also it has developed into a prime marketing strategy. The U. S. Post Office has issued flat fee overnight delivery rates, and other delivery services have entered the overnight market. Additionally, in January 1982, Emery decided, after a twenty-four month trade and consumer research period, to provide overnight delivery of any size package as well as lower cost options for delivery by 5 p. m. Emery also invested in a fifty million dollar cargo sorting and handling facility, which serves its hub in Dayton, Ohio [Ref. 8]. The chairman and chief executive officer of Emery stated "We cannot any longer rely on the commercial airlines to give us space-when-available when we are generating a million pounds of cargo a day in the U. S." [Ref. 9]. As a result, Emery has added more aircraft to its operations so that it now carries 85 percent of its own cargo (instead of 50 percent carried in 1981).

Air-cargo specialists anticipate continued annual growth rates of three to five percent over the next five years and increased competition between air cargo airlines and air freight forwarders. The executive vice president of Flying Tigers Inc. has suggested that during the 1980's a number of large multi-transport cargo companies will emerge and will act as both forwarders and airlines [Ref. 10]. Each company is offering consumers slightly different services, service to more cities, money back guarantees, higher reliability, and tailored service to the customers' needs.

B. THE NAVY QUICK TRANSPORTATION SYSTEM

At the end of World War II the Naval Air Transport Service (NATS) had 431 aircraft and 26,134 officers and enlisted personnel [Ref. 11]. Between demobilization and the Key West Agreement of 1948, the Navy was left with only limited air cargo service.[1]

NATS was merged with the Air Transport Command to become the Military Air Transport service (MATS). The Air Force was directed to provide air transportation for all the Armed Forces. The Department of the Air Force then charged MATS with the responsibility to satisy each service's airlift requirements. One of the major difficulties arising from this action was that airlift capability allocated by MATS was so imbalanced that users were placed in either a feast or famine situation [Ref. 11]. During periods of peace, significant excess capacity was available. However, during periods of international tension, most airlift capability was assigned to overseas commitments leaving little domestic capability to airlift users' requirements.

The Defense Department recognized the individual services needs for dedicated airlift of high priority cargo and authorized the logistics agencies of both the Navy and the Air Force to manage their own airlift services. This action provided the impetus for the establishment of the Navy's Quick Transportation System (QUICKTRANS) contract airlift services in July, 1950. The QUICKTRANS operation and the Air Force's Logistic Air System (LOGAIR) satisfied the all-cargo air service requirement between east and west coast Naval Supply Centers and fleet commands. This system

---

[1] The "Key West Agreement" resulted in the realignment of functions between the Army, Navy, and Air Force and directed the newly-established Air Force, to provide air transportation for the Armed Forces except as otherwise assigned.

was designed with the flexibility of both scheduled and non-scheduled operations.

In June, 1956 the commercial air carriers contended that MATS activities were unfairly competing with their operations and were detrimental to the economic well being of the industry [Ref. 12]. This argument has arisen often since that time in Congressional hearings on military air transportation.

In 1961, the decision was made that the military would enter into contracts with commercial air carriers under negotiation procedures for both international and domestic airlift operations. This was the first time that

> "the terms and conditions of the request for proposal (RFP) clearly advised participants that among the other factors to be considered by the government ... is whether the contractor is an "air carrier" within the meanings of the Federal Aviation Act of 1958." [Ref. 13]

In a statement before a subcommittee hearing in 1963, Assistant Secretary of the Air Force Joseph Imirie stated that the contractual agreement (for QUICKTRANS and the Air Force's LOGAIR) was needed because the route structure of the common carrier did not meet service requirements for direct resupply service of primary weapons systems [Ref. 14].

In August, 1962 a Civil Reserve Airlift Fleet (CRAF) was established to assure airlift capability in time of war or national emergency. With the provision of a domestic portion of CRAF, the continuity of both QUICKTRANS and LOGAIR was assured since their present status would not be affected by either a national emgerency or DOD requirements [Ref. 15]. During this establishment of a domestic CRAF it was stated that the use of door-to-door, air-truck combination delivery service (recently proposed by air carriers)

was being explored by the Defense Traffic Management Service and the military services.

In 1973 Congressional committees received information which indicated the need for legislation pertaining to domestic air carrier operations of the Department of Defense. The committees decided that further investigation was required to determine the extent to which military air transport operations divert traffic from civilian air lines [Ref. 16].

C. CURRENT QUICKTRANS OPERATIONS

The current QUICKTRANS system is a composite of three separate, commercially operated components. Each component operates under its own contract or contracts and is integrated into a transportation system through the management concept of centralized coordination and control. The QUICKTRANS system is an integral element of the Defense Transportation System and can best be described as follows:

> "QUICKTRANS is a Navy managed, commercial contract cargo airlift and truck service system that provides fast, flexible, and responsive transportation for high-priority Navy and Marine Corps cargo moving between points of manufacture or overhaul, and points of consumption within the continental United States. It further provides rapid delivery of air eligible cargo between points of generation and Military Airlift Command (MAC) aerial ports of embarkation." [Ref. 17]

The 1983 QUICKTRANS route structure is displayed in Appendix A and is primarily an intra-coastal transportation network operating on both the East and West coast with two inter-coastal links. Those activities which are listed in Appendix B and preceded by an asterisk are service points and those preceded by a plus sign maintain air terminal operations within the context of the Navy's Quick Transportation System. A single air carrier (Transamerica)

and terminal contractor (CFE Air Cargo, Inc.) are involved in the system with a multitude of trucking concerns. A portion of these trucking firms operate over dedicated truck routes and form one of the QUICKTRANS dedicated truck systems (see Appendix C), other firms form a dedicated expansion system (CONTRUCK), and the remaining firms are involved with the local delivery of the cargo. The primary dedicated truck system is for the purpose of moving truck load quantity cargo between specific origin-destination pairs in the normal course of business. The expansion system operates over the same routes utilized by the airlift contractor and provides for 96 hour across country delivery of excess air freight. The local delivery firms operate in conjunction with the terminal contractor and deliver the cargo to the end users.

Oversight of the QUICKTRANS system is conducted by the Naval Supply Systems Command Headquarters (NAVSUP) in Washington, D.C. and it is coordinated and managed by the Navy Material Transportation Office (NAVMTO) in Norfolk, Va. MAC is the contracting and oversight agency for the airlift segment of QUICKTRANS; the Navy Regional Contracting Center (NRCC), Washington Navy Yard, contracts for freight terminaling services; and, the Military Traffic Management Command (MTMC) contracts for individual truck routing between QUICKTRANS terminals and nearby installations.

The QUICKTRANS system is funded on an annual basis. This funding is for the explicit purpose of moving high priority cargo from points of origin to points of destination within the time frames established by the Uniform Materiel Movement and Issue Priority System (UMMIPS). UMMIPS time frames for the movement of high priority material is three calendar days for priorities 01, 02, or 03 and six calendar days for for priorities 04, 05, or 06 [Ref. 18]. This is the total transportation time frame

allowed for holding the material for transportation, in-transit movement, and delivery of the material. Presently, the Navy budgets forty million dollars annually for all portions of QUICKTRANS operations. ($25.5 million for air service, $11 million on terminal services, and $3.5 million on truck services.) Historically, over ninety-five percent of each year's budget is actually expended on operations with the excess remaining unobligated.

QUICKTRANS moves approximately 57,000 tons (2,000 pound tons) of cargo annually in its network. Approximately fifty percent of this cargo moves between the East and West coast, another thirty percent moves up and down the East coast, and the remaining twenty percent moves up and down the West coast [Ref. 19]. Appendix D (derived from the July 1983 NAVMTO fiscal year-to-date Origin Cargo Distribution Report) displays the average monthly quantity of cargo tonnage moved between the various origin-destination pairs within the QUICKTRANS system. The two cargo categories utilized in the report are AIR and DVT. The classification AIR means that cargo which should have gone by air (it does not mean the amount of tonnage which did move by air). DVT means that tonnage of material which did not need to move by air (it does not mean that it did not move by air). The total for the priority one and two categories indicate the total tonnage of cargo that was moved from a specific point of origin or received at a specific point of destination, that should have moved by air, by Transportation Priority (TP) classification. TP1 (equivalent to UMMIPS priorities 01, 02, 03) requires delivery of cargo within 72 hours of shipment and TP2 (equivalent to UMMIPS priorities 04, 05, 06) requires delivery within 144 hours of shipment.

Since precise data on the quantity of TP1 and TP2 cargo moved between every point of origin to every point of destination were not available, it was assumed that the same

ratio of total priority one and two cargo shipped from each point of origin applied to all points of destination to which cargo was shipped. Based on this assumption, Appendix E shows the quantity, in tons, that should have moved by air to and from the various origin-destination pairs by TP classifications. Using the same basic assumption and further assuming that the DVT category was similarly distributed between priorities, Appendix F shows the total movement of cargo within the system by TP classification.

III. QUICKTRANS CONTRACTING CRITERIA AND PROCEDURES

The Navy's QUICKTRANS system is a combination of three separately awarded contracts which are required to fulfill different system needs. Award of each contract is the responsibility of a different government agency and requires the use of tailored contracting criteria and procedures in order to elicit the desired commercial response. The following sections briefly describe the contract requirements and the procedures necessary for the award of the airlift, terminaling, and land-haul service contracts.

A. AIRLIFT SERVICES

In very general terms, the contractor is responsible for providing air transportation services over the routes prescribed in the airlift contract. These routes are established by the Administrative Contracting Officer (ACO), NAVMTO. The various services required by the contract include performance of flight operations with contractor operated aircraft and all contractor provided services such as maintenance, fleet service, ground services and supply support of aircraft. Additionally, the contractor must provide sufficient operational and crew personnel to ensure the capability to properly support the flights and provide appropriate ground services [Ref. 20]. The following subsections address the airlift contract requirements and procedures in more detail and are limited to the more restrictive requirements set forth in the contract.

1. Criteria

The criteria for the airlift contract are based on requirements derived from two separate sources - federal legislation which includes both the Federal Aviation Act of 1958 [Ref. 21] and Federal Aviation Regulations, Part 121 [Ref. 22] and the Department of the Navy which provides the operational criteria for the contract. This section describes first the Federal Government requirements and then the Navy's Operational requirements.

a. Federal Criteria

The aircraft offered for the QUICKTRANS airlift contract must be of United States registry, owned or controlled by an air carrier, and suitable for domestic CRAF allocation at the time of offer. This statement contains a number of prerequisites which must be met before an offer can be made for consideration.

The airlift contract is conditioned upon the contractor meeting two federally mandated requirements. The first is that the contractor must be an "Air Carrier" within the meaning of the Federal Aviation Act of 1958 and the second requirement is that the contractor must hold an operating certificate in accordance with Federal Aviation Regulations. Section 101(3) of the Act defines air carriers as follows:

> "Air carrier means any citizen of the United States who undertakes, whether directly or indirectly or by a lease or any other arrangement, to engage in air transportation: provided, that the board may by order relieve air carriers who are not directly engaged in the operation of aircraft in air transportation from the provisions of this act to the extent and for such periods as may be in the public interest." [Ref. 21]

Additionally, section 401(a) of the Act states:

> "No air carrier shall engage in any air transportation unless there is in force a certificate issued by the board authorizing such air carriers to engage in such transportation" [Ref. 21].

The certificate referred to in this section of the Act is the Certificate of Public Convenience and Necessity and requires that a carrier must prove that a public need exists and that the carrier is fit, willing, and able to provide the needed service [Ref. 23]. Concurrently, the certificate may specify the commodities to be hauled, the areas to be served, and the routes to be used. Federal Aviation Regulations, Part 121 [Ref. 22] set forth the specific requirements for an air carrier's operating certificate, the criteria to be met, and the procedures necessary for each air carrier classification to obtain such a certificate.

Suitability for the CRAF arises because the CRAF Program is a national plan for the utilization of commercial airlift resources when needed to support Department of Defense requirements in an airlift or national emergency. Since some aircraft types are more appropriate than others in fulfilling defense emergency airlift requirements, the CRAF program specifies the types of aircraft which are deemed suitable for allocation. The following types of aircraft have been determined to fulfill the Department of Defense requirements and are eligible for the domestic CRAF in connection with both LOGAIR and QUICKTRANS contracts:

DC-9-30 Series
L-100-10/20/30 or L-382
B-727C or QC
L-188C

b. Navy Criteria

The QUICKTRANS airlift criteria set forth by the Navy can be categorized into the following three categories: Equipment and Services, Operational Requirements, and Administrative Requirements. Each category is discussed separately in the following sections.

(1) Equipment and Services. The contract provisions for airlift services are very specific when addressing aircraft requirements and more generalized when addressing the other various types of equipment and services which are required for the performance of the contract. Both equipment and services can be classified as either contractor furnished or government furnished and, if government furnished, as either reimbursable or non-reimbursable.

The aircraft offered for the QUICKTRANS airlift contract must be a turbine-powered aircraft capable of accommodating 463L pallets (54" X 88" or 108" X 88"), have a minimum aircraft cabin load (ACL) of 46,000 pounds and 16 pallet positions (54' X 88"), and straight-in, truck bed height loading. These specific requirements are based upon a number of different considerations which are related to efficiency and Air Force air transportation requirements. In the mid to late 1960's the Office of the Assistant Secretary of Defense (OASD) issued a directive which forced the military to switch from piston-driven engines to the more powerful turbine-powered. This switch was predicated on the airlift ability of the engines. The piston engines did not provide the airlift capabilities deemed necessary for the envisioned airlift requirements of the domestic CRAF, whereas turbine-power aircraft did provide such capabilities.

The pallet requirements are based on the 463L pallet being the the standard military pallet selected by the Air Force for air cargo transportation. Usage of this type of pallet allows the users to build pallet trains and square pallets which are compatible with the MAC transportation system. The poundage and pallet position requirements were derived from the anticipated demand for air transportation. The poundage requirement is based on the expected average weight requirements for coast-to-coast shipments and the number of pallet positions allows for oversize cargo such as periscopes, helicopter rotor blades, aircraft propellers and aircraft engines. Smaller aircraft cabin load capabilities were deemed to be inefficient given the lift capability of the engines. The loading requirements are predicated on the concepts of minimizing both ground time and loading times. By using straight-in, truck bed height loading, pallets can be built on the ground, pre-positioned for loading, and loaded or unloaded with minimum difficulty or delay. This reduces both gound time for the aircraft and loading time for the cargo, thereby increasing operational efficency of the aircraft by allowing for more flight time and air lifted cargo per day. The only aircraft which is eligible for allocation to the domestic CRAF which offers such capabilities is the L-100-30.

Additional aircraft configuration requirements call for two permanent foam rubber or equivalent covered seats with spearately controlled reading lamps. These seats must be installed in the heated portion of the aircraft and are required for the purpose of transporting route inspectors, ARFCOS personnel, and protective service personnel who are required to accompany certain DOD cargo. In order to facilitate the previously mentioned loading objectives, the aircraft must also be equipped with a 463L compatible cargo pallet loading system which includes door

and sill protection, ball transfer plates (side loading aircraft only), retractable pallet locks and side guides.

There are also other aircraft requirements mandated in the contract which are less restrictive in nature and, therefore, are not included in the discussion of criteria for the purpose of this study.

The contractor is required to furnish all facilities, supplies, weight and balance forms, other forms, teletype paper, tape, ribbon and other material, and equipment to support and perform the airlift requirements specified in the contract. Furthermore, the contractor is expected to be self-supporting at all bases of operations. The only exception to this requirement is that the government will furnish the equipment and services indicated in Appendix G on a no-cost basis. The contract specifies that the contractor will supply its own APU, air start unit, and other equipment necessary to perform scheduled maintenance as well as special equipment such as tow bars and equipment for handling the aircraft.

All airport service fees and charges incurred in the execution of the airlift contract will not be reimbursed expect when such charges and fees are incurred because the government directed the air carrier to load or unload or purchase fuel at an airport not listed in Appendix B (and followed by an asterisk) or to land at an airport that was not a military installation.

(2) Operational Requirements. The QUICKTRANS system has a number of specific points where cargo originates, is collected for shipment or disbursement, or is consumed. These points are equally distributed on both the East and West coasts. Accordingly, the contractor is required to have a flight schedule similiar to Appendix H in order to service these points with the desired frequency. There are provisions for departures from the schedule in the area of specific holidays.

The main cargo service points at Travis AFB, NAS North Island, NAS Norfolk, Charleston AFB, NAS Jacksonville, and Dover AFB must be served seven days a week in order to expedite cargo movement and keep both cargo weight and volume at a consistent level. The ground time allowed at each of the service points, which includes the contractor's loading and unloading of cargo, is specifically stated in the contract and ranges from a minimum of one hour to a maximum of two hours.

The only restrictions which are placed on the type of cargo which may be transported on the aircraft revolves around the ownership of the cargo. The contractor is restricted to transporting only government owned or directed cargo and the government reserves the right to utilize all of the excess cabin capacity, over the guaranteed aircraft load, to transport any additional cargo it deems necessary at no additional cost. The contractor, however, may transport required route support items in any excess cabin space with the permission of the ACO.

In addition to the normally expected cargo, the contractor must also transport hazardous materials and classified secret protective security service (PSS), confidential signature security service (SSS), or sensitive signature service required - QUICKTRANS only (SSR-QTO) materials. The transportation of hazardous materials is provided for in Air Force regulation 71-4 as provided for by the Department of Transportation (DOT) exemption 7573 and DOT, FAA, and International Aviation Transportation Authority (IATA) regulations. The transportation of classified material places more than just airlift requirements upon the contractor. There are specific security requirements which must be met. These requirements are set forth in the Industrial Security Manual (DOD 5220.22-M) and the carrier supplement thereto. These

requirements include, but are not limited to, the establishment of administrative procedures to insure the maximum degree of safeguard for classified information, the clearance of all contractor personnel who are involved in the receipt, transportation, handling or release of classified material up to the security classification of secret, and the issuance of security identification cards to those employees.

The last major operational area to be addressed is that of aircraft maintenance. The aircraft provided under the conditions of the airlift contract are expected to be capable of completing the required flights without requiring scheduled maintenance. It is the contractor's responsibility to arrange for all scheduled maintenance and to provide for the movement of aircraft to and from his selected maintenance activity without charge to the government. These aircraft movements and periods of inoperability are not considered part of the scheduled route operations. The only maintenance actions to be performed at military installations are bona fide emergencies and enroute or turnaround services. No charge will be assessed against the contractor for any government furnished services required to perform these enroute or turnaround maintenance checks or services.

(3) Administrative Requirements. As with all contracts, the airlift contract contains a number of requirements which can be considered administrative in nature. The contract is for a one year period, commencing on 1 October each year and terminating on 30 September the following year. If required, it may be extended in monthly increments for no more than three months.

Although a firm schedule is required under the contract and the contractor may be penalized for violations of that schedule, the government reserves the right to

revise the flight schedule or route pattern with eight hours notice. Additionally, the government has the right to delay any schedule departure time up to a maximum of four hours and the contractor is not entitled to any compensation for such changes in schedule, routes, or delays. The contractor is evaluated each month on his ability to keep to the fixed flight schedule. A monthly schedule reliability rating is computed through a formula which utilizes contractor caused delays and cancellations, penalty values based on the length of the delays, and the number of actual departures during the month. The results of this rating are then used during the next contract award cycle. If the contractor does not maintain a minimum acceptable rating, then the contractor's award index will be reduced by the percentage difference between the years average rating and the minimum acceptable rating. The award index will also be reduced if the carrier fails to achieve 60 percent of their revenues from civil air transportation during a specified one year period. The amount of reduction will be equal to the percentage difference between the 60 percent requirement and the actual percentage achieved.

With any government endeavor certain requirements are inevitable. Reports are such a requirement. The airlift contract requires that the contractor maintain a Captain's Trip Report to record all deviations from the schedules and any reasons for such deviations. A copy of this report must be furnished to the ACO on a weekly basis. An Aircraft Plot Report is also required to be submitted twice daily detailing the scheduled flights for the next 24 hour period. MAC requires that the contractor report LOGAIR/QUICKTRANS traffic statictics on a monthly basis. The final report is a monthly Fuel Report which identifies the fuel brought into and taken out of the QUICKTRANS system. The amounts of fuel brought into and

taken out of the system are reconciled at the end of each month with either the contractor or the government receiving credit for the differences in the balance. This last report is an important one since the fuel utilized in the execution of the QUICKTRANS airlift contract is provided to the contractor on a no-cost basis.

When a contractor is providing transportation services which include both the movement of passengers and cargo, the carrier must, at its own expense, procure and maintain passenger and public liability insurance to at least the minimum limits allowed by law. This coverage must be demonstrated to the contracting officer by the presentation of a Certificate of Insurance. During periods when the CRAF is activated, the government will idemnify the contractor against loss of or damage to CRAF aircraft and claims by third parties, provided the contractor carries Non-premimum War Risk Insurance. Since only government cargo is involved in the execution of this contract, the government relieves the contractor of liability for loss of or damage to any and all government cargo transported by the contractor in the performance of the contract, except if such loss or damage should result from the misconduct or lack of good faith on the part of the contractor.

Since the airlift contract is expressly for the purpose of movement of military high priority cargo, certain precautions must be taken to avoid the possibility of interruptions of that cargo movement. The most likely form of interruption would be a strike by the contractor's employees. Accordingly, the contractor must negotiate a no work stoppage agreement with their employees for the duration of the contract.

The final administrative matters involving the contract are the procedures for payment for services performed under the contract. Under the contract, the

contractor is to be paid $5.0667 per air statute mile flown and $250.00 per directed landing, regardless of the weight or volume of cargo carried. The mileage flown is determined by utilizing the Civil Aeronautics Board's (CAB) great circle computed statute miles from airport to airport. In order to be paid for landings, those landings must be scheduled landings directed by the government. These do not include landings for fuel, crew changes, or emergency landings. Payment will be made upon receipt and verification of the contractors certifed invoice by the ACO. The verification will be accomplished by the ACO who will compare the contractor's invoice with a QUICKTRANS Flight Following Report furnished by the government. In addition to payment for the miles flown and directed landings, the government will reimburse the contractor for the previously mentioned items which are considered reimbursable.

2. Procedures

The QUICKTRANS airlift contract procedures commence with a purchase request from the Naval Supply Systems Command (NAVSUP) in approximately June of each year. Based upon this request, the DOD manager for airlift services, MAC, issues a request for proposal (RFP) for a fixed price negotiated procurement action in August. The criteria previously mentioned in this chapter forms the basis of the solicitation document.

The reason the airlift contract is a negotiated procurement instead of a formally advertized procurement is contained in the Memorandum of Understanding (MOU) between the air carrier and the Air Force. The MOU is for the purpose of establishing the guidelines to facilitate the solicitation, negotiation, and placement of DOD contracts for airlift services. The MOU establishes the agreement between the two parties involved that the carrier will participate in the CRAF. It further states:

> "that the parties agree that the CAB methodology by which minimum rates for DOD airlift service contracts were established was an effective means of establishing fair and reasonable rates and furthering the objectives of the CRAF program; therefore, the parties agree to the continued use of the CAB-established methodology, to the extent reasonable practicable, in their negotiation of rates for future DOD airlift service requirements" [Ref. 24].

MAC utilizes a bidders list comprised of eligible air carriers similiar to the list contained in Appendix I. A solicitation document is forwarded to each eligible carrier on the list in an attempt to stimulate interest and result in a proposal. All responsive bidders are subject to a pre-award on-site equal opportunity compliance review to ensure the prospective contractor is able to comply with the provision of the Equal Opportunity clause contained in the solicitation document and with all other Defense Acquisition Regulations (DAR) contract clause provisions.

Additional requirements which must be met before an offer can be considered for award include an evaluation of the carrier's financial and technical abilities. The contractor must demonstrate its financial ability to perform the contract through submission of current financial statements and other requested financial data in addition to allowing the government to audit its financial records, if requested. Evaluation of technical ability is based upon the evidence submitted to the Contracting Officer which demonstrates the contractor's ability to furnish the types and quantities of aircraft, in an acceptable configuration, necessary to perform the contract provisions and other information on past experience or performance, management controls, aircraft and pilot records, etc.

The award of the airlift contract is based on the number of aircraft, by type, which are made available for use by both LOGAIR and QUICKTRANS and for allocation to the CRAF, the relative value to the MAC mission of those

aircraft offered and accepted by MAC, and the lowest overall cost to the government, including the cost of the fuel furnished by the government.

The dollar amount of domestic business to be offered to the offeror, for both LOGAIR and QUICKTRANS, is based upon the the Mobilization Base Index (MBI). The MBI is the sum total of the Mobilization Value (MV) of each aircraft type offered and accepted by MAC. Table I shows the MV for each of the aircraft considered suitable for allocation to the CRAF.

TABLE I

Mobilization Base Values for Domestic Aircraft

Aircraft	Speed (Knots)	ACL (Tons)	MV
B-727C/QC	345	17.895	6.174
DC-9-30C	325	17.431	5.665
L-100-30	245	21.755	5.330
L-100-20	245	19.005	4.656
L-100-10/L-382	245	15.920	3.900
L-188C	240	17.310	4.154

Each offeror's domestic MBI divided by the total domestic Mobilization Base Indices for all offerors is the fraction of the LOGAIR and/or QUICKTRANS contract which will be offered to the contractor. However, in determining the tenative dollar awards the first consideration will be given to broadening of the mobilization base, second consideration will be given to effective route operations, and the third consideration will be given to the lowest overall cost to

the government, including fuel. These considerations will, to the extent necessary, take precedence over the award computation described above.

The contract which results from this process will specify the ACL guaranteed by the government, the route patterns to be flown, the total miles purchased and the unit price per aircraft mile, the total estimated number of directed landings, the unit price per directed landing, and the total price of the contract.

B. TERMINALING SERVICES

Bridging the gap between long distance airlift movement and local pick-up and delivery trucking is the terminaling service. The contractor for this service is generally responsible for the smooth interface and through-put of cargo between the different transportation modes. In addition to the warehousing and movement of QUICKTRANS cargo, the terminaling contractor has the responsibility for several cargo handling requirements and ancillary services, as well as many administrative and reporting requirements [Ref. 25]. In the following subsections the more significant contractual requirements for terminaling services will be addressed. Following that will be a review of the procedures leading to the formulation of the terminaling services contract and its award.

1. Criteria

The criteria for the terminaling contract are based solely on requirements formulated by NAVMTO, which is the single manager for Navy material movement. These requirments may be classified in five general areas: Terminal Operations, Facilities and Equipment, Services, Administration and Reporting. Each of these is addressed separately below.

a. Terminal Operations Requirements

This requirement calls on the contractor for the specific movement of QUICKTRANS cargo and ballast in the loading and unloading of government or commercially owned vehicles. Included in these are aircraft, trucks and shipping containers. There are also contract provisions for the warehousing of cargo while it is between transportation modes. Additionally, the terminaling contractor must construct his terminaling services in such a way that they are compatible physically and informationally with three other cargo movement systems. This interface must exist among QUICKTRANS and the Northeast Dedicated Truck System, the CONTRUCK system and, for less-than-truckload shipments, the Tidewater (Virginia) Area Rapid Delivery System. The contract also delineates the times of the day that the contractor must provide terminaling services at each of the nine locations. These are flexibly determined by the hours of operation of the local QUICKTRANS user activities.

b. Facilities and Equipment Requirements

While the physical structures for QUICKTRANS terminaling are provided for by the government, the contractor must provide and maintain enclosed and secure areas for SSS, PSS, SSR-QTO and refrigerated material. Operational equipment provided for by the contractor include necessary material handling equipment, weighing scales for cargo and various handling equipments for ramp services. The terminaling contractor must obtain and put in place all computer equipment necessary for the operation of the QUICKTRANS INFOSYSTEM as well as data communications terminals for the COMNET system. In addition, the contractor is required to maintain certain publications and forms, and to erect specific signs at each terminal location.

c. Service Requirements

Several services in support of the overall QUICKTRANS operation are required of the terminal contractor. Primary among these are the arrangement for fuel and servicing for the airlift contractor as well as the provision of ramp services for the aircraft. The contractor also must provide cargo pick-up and delivery services for user activities in the vicinity of each terminal. Lesser services extended include handling of escort and courier passengers, maintenance of telephone and cargo monitoring services, and general housekeeping of all facilities and equipment supplied by the government.

d. Administrative Requirements

Among the many administrative requirements imposed on the contractor, three stand out with particular significance. The first is the assumption of limited liablility by the contractor for any loss or damage of cargo in the entire QUICKTRANS system. In essence, damage and loss less the one quarter of one per cent of the value of a monthly average of cargo in the sytem is absorbed by the Navy. Everything in excess of that is a liability assumed by the contractor. Secondly, the contractor must assume liablility, as the Department of Transportation certificating party, that all shipments of hazardous material are packaged and labeled in accordance with the provisions of Title 49 of the Code of Federal Regulations and of other regulations. Lastly, the contractor must establish and maintain a quality control program for the maintenance of contract requirements and standards. The program must include an inspection system, methodology for discrepancy identification, and documentation of inspection results and corrective actions. Lesser administrative

requirements range from exclusivity in use of government facilities and coordination of pallet return from users to adherence to local regulations and maintenance of telephone listings.

e. Reporting Requirements

Of all of the requirement areas, reporting provides the greatest number of individual requirements. The contract identifies thirty one reports that are required to be initiated by the contractor and transmitted to the ACO. These have been divided into three categories: operational reports, performance reports and management reports. Several reports provide information that is duplicated in reports that are required of the airlift contractor. Ostensibly, this is done to provide verification of critical data.

Operational reports account for seventeen of all the reporting requirements and fall generally into three types. The first deals with loading configurations and statistics of both cargo on pallets and pallets on aircraft. The second type provides accountability for aircraft fuel entering and exiting the QUICKTRANS system. The last type of operational reporting requirement provides control, monitoring and routing of aircraft and flights.

The second category of reports, those concerning performance, are comprised of seven reports of two types. The first of these analyzes scheduling and delay of flights while the second addresses terminal performance and overall system reliability.

The remaining reports all have to do with management information and are of three types. The first identifies demand and usage of the system while the second type analyzes the distribution of cargo throughout the system. Finally, reports are furnished which provide

information on certain cargo types such as hazardous material and security service cargo.

2. Procedures

The contracting of QUICKTRANS terminaling services has been an annual event. Following determination of requirements, NAVMTC forwards a contract request to NRCC Washington. From that document a Request For Proposal is developed and subsequently is advertised in the Commerce Business Daily. The RFP is also forwarded individually to several companies that are maintained on a bidder's list. Respondents to the RFP become liable for a pre-award survey to assure to their adherence to general government contracting requirements and to the specific contract's capability requirements. Following negotiations, the award is made as a fixed price award fee contract. The successful respondent is contracted from 1 October to 30 September.

While the terminaling services contract is not advertised as a sole source award, there has been only one capable source for the past several years, CFE Air Cargo Inc. CFE has enjoyed this position based on its singular ability to demonstrate the capability of meeting the requirements of volume and time considerations within the QUICKTRANS system.

In an attempt at stimulating competition and relieving the sole source situation, NAVMTO submitted its contract request for terminal services commencing in Fiscal Year 1983 as a multi-year procurement. Due to amendment requirements for changes in quality assurance and the tightening of other contract requirements, there was insufficient response time for multi-year award to be a reality for Fiscal Year 1983. That year's award was again made to CFE and the multi-year aspect was delayed until commencement of the Fiscal Year 1984 procurement cycle.

C. LAND-HAUL SERVICES

The land-haul component of the QUICKTRANS system is the simplest segment in terms of both criteria and procedures. The land-haul services component is a network of independently owned and operated trucking firms which are responsible for the pick-up of cargo at a specified points of orgin for delivery to specific points of destination.

1. Criteria

The major criteria necessary for this portion of the QUICKTRANS system are the Federal and State requirements for the commercial transportation of goods, both between states and/or within a state, the appropriate transportation equipment, and security requirements for transportation of confidential material.

In order to be eligible to contract for the movement of government cargo for QUICKTRANS, the carrier must have the necessary operating authority from both the Interstate Commerence Commission (ICC) (for interstate routes) and the appropriate state transportation authorities for intrastate routes. Each state has its own requirements for a commercial operating licence; however, these requirements are generally similiar in nature to those established by the ICC.

The type of equipment a carrier must have is determined by the trunk route for which it is applying. The carrier must have the appropriate type and size equipment necessary to transport the normal cargo volume and weight generated at the specific points of origin from which it would operate. Since all route requirements are different, there are no set equipment criteria which applies to all routes.

Security requirements arise because the carrier must be capable of transporting SSS material either to or from terminal facilities or between other QUICKTRANS service points. The basic security requirement which must be met is that of security clearances for those contractor employees who would receive, transport, or deliver confidential cargo. These employees must hold a confidential security clearance.

2. Procedures

The procedures utilized in award of a route to a specific carrier are straight forward and uncomplicated. The process starts when a contractor submits a Uniform Tender of Rates and/or Charges for Transportation Services to the Contracting Officer. This is a one year tender to the U. S. Government (not to the Navy or QUICKTRANS) and offers to transport a particular freight classification, normally Freight All Kinds, between specific points. The tender may exclude specific types of cargo, such as ammunition and explosives, from the offer.

The tender may be based upon either a truck load (TL) rate or a less than truck load (LTL) rate. The TL rates are utilized for the dedicated QUICKTRANS routes and the LTL rates are utilized for the local delivery services discussed previously under the terminal contract. The dedicated route service charges include the exclusive use of the vehicle for the purpose of transporting government cargo, expedited service, and some combination of shipper/consignee load or unload service (varies by tender). Since the service to be provided may vary from trip to trip, additional considerations are also provided for in the tender. The charge may be based upon either a one-way or round trip. In either case a firm price per trip is specified regardless of the actual weight or volume transported. Additional charges may be specified when there is a requirement for the

transportation of SSS material or when intermediate stops are required between the origin and termination points.

Competition may not be an obvious part of this procedure; however, it does exist for at least some of the routes. The land-hual services are competitive in that the carrier with the lowest cost for a specific route is selected for that route. Carriers in highly competitive areas must be competitive in order to qualify for award of the route. Unfortunately, carriers in less competitive areas do not have to be as concerned about the competitiveness of their tenders.

Upon determination of need, NAVMTO will contact MTMC and obtain a standing route order for a specific route. A standing route order is nothing more than a tender which has been accepted and converted into a contract by MTMC.

IV. COMMERCIAL AIR CARGO INDUSTRY

This chapter identifies the rationale and process for the selection of a commercial air cargo carrier as a representative of the industry, and describes the structural characteristics and service capabilities of the representative.

A. SELECTION PROCESS FOR A REPRESENTATIVE CARRIER

In order to assess the viability of having a commercial alternative to QUICKTRANS, a large domestic air cargo carrier that was most representative of the industry was desired for comparison. From the multitude of listed air cargo carriers [Ref. 26], five were initially contacted: Federal Express, Purolator, Emery Worldwide, Flying Tigers, and Airborne Express. From these, only one representative was to be drawn since the desire for single carrier responsibility was one of the principal motivating factors directing this study. This desire was premised in the logic that, with one carrier, fewer duplications of effort would be expected; reductions in handling between carriers would tend to reduce loss and damage in transit and would enhance through-put time; a singular transportation base rate would simplify contract administration, invoice submission and bill paying; and the fixing of responsibility for the movement of cargo would be straight forward.

The five above mentioned carriers were contacted by telephone. A complete service and rate guide was requested from each as soon as possible. None, save Emery, responded to the first request. Emery provided its domestic service and rate guide [Ref. 27] as well as its pick-up and delivery

tariff guide [Ref. 28]. These two items were delivered via Emery's own door-to-door delivery service. The information was received on the morning of the second business day following the request. The four remaining carriers were subsequently re-contacted and the requests were restated. Purolator replied, by United States Postal Service, with its service and rate guide nine days after the second request. The three remaining carriers never responded to the requests, and information regarding their service capabilities was obtained from public sources.

The selection of the representative carrier was primarily dependent on carrier capabilities and services offered, although author expediency and ease in obtaining data and information were influencing factors. The capability and service differences between carriers were considered in a very broad sense. The carrier selection was primarily based on the ability to move the types and quantities of cargo between the various locations in the same way it is currently perofrmed by the existing QUICKTRANS contractors.

The five alternative carriers were disposed of as follows:

(1) Flying Tigers was immediately dropped from consideration when it was determined that door-to-door pickup and delivery service was not offered. The absence of the service would require the contracting of an additional carrier(s) to transport Navy cargo between air terminals served by Flying Tigers and Navy user activities. This would clearly be outside the criterion of single carrier responsibility.

(2) Following identification of company imposed restrictions on size and weight of cargo that could be shipped, three additional carriers (Federal Express, Purolator and Airborne Express) were dropped from consideration.

(3) Emery Worldwide, the surviving alternative, advertises that it will deliver any size, any weight shipment to any point in the United States [Ref. 29]. The varieties of service selections and shipping options offered are described in the succeeding sections of this chapter.

While Emery Worldwide has been selected as a commercial representative for modeling and comparison with QUICKTRANS, this is in no way a recommendation for Emery nor a recommendation against the other carriers as contractual successors to the QUICKTRANS system. Rather, at the time of this research, Emery either offered the most inclusive existing air freight services among its competitors or it displayed capabilities likely to be replicated by the rest of the industry in the event that the movement of Navy high priority cargo is offered to competitive commercial contract.

B. EMERY SERVICE CHARACTERISTICS AND CAPABILITIES

In this section Emery's customer service options for timeliness and convenience are defined and explained. Following those, various other characteristics and capabilities of Emery are identified. They are segmented into general, airlift, terminaling and land-haul categories for later comparison with corresponding QUICKTRANS system requirements.

1. Service Options

Emery has two classes of Monday to Friday service, emergency and standard, each of which is divided into types. While all classes and types of service will accomodate any size and any weight shipments between points anywhere in the continental United States, the distinctions between them are

based on timeliness considerations. Decreasing timeliness of service is paralled by decreasing cost.

Emery offers two types of emergency class service. The quickest is Same Day service which guarantees delivery on the same day provided pickup is accomplished by a certain time of day. The other is 9AM Deadline service which guarantees delivery by 9AM the following day. Again, the pickup constraint exists.

There are three types of standard service offered by Emery. The AM and PM services assure delivery the next morning or afternoon respectively. Emery Day-2 service (with rates 30-40 percent below PM service) guarantees delivery on the second business day following pickup.

The additional service options, supplementary to any of the above, are Saturday service, EP/BP service and door-to-door service. Saturday service, currently available for all types of service other than Day-2, allows for pickup on Friday and delivery before 5 PM on Saturday or pickup on Saturday and delivery on the next Tuesday. EP/BP service extends the service area of each Emery service office to include all off-line points - those locations which lie outside the normal transportation distribution network. Door-to-door service is available to all points anywhere, anytime during normal business hours. All of the above service options are provided at additional cost.

2. General Characteristics and Capabilities

Described in national advertising by its founder, John C. Emery II, Emery Worldwide is a full-service transportation system and not merely a cargo handling operation. With an average of fifty-thousand shipments weighing 1.6 million pounds moving through its system each day, Emery maintains information and control for each shipment through its automated EMCON (EMery CONtrol) system. A real-time,

on-line telcommunications network, EMCON can provide instantaneous shipment tracing and expediting information 24 hours a day. Emery customers may link with EMCON either by telephone or through the user's own data terminals. This service is provided without additional charge. Utilizing a major IBM data processing system, Emery gathers management and operational information. Selected data on shipment weight, movement, and frequency, as well as limited user-specific statistics, are avilable to Emery customers.

Maintaining primarily B727 and DC8 aircraft in its air fleet, Emery has cockpit seating for two couriers or escorts on each flight. Without refrigeration equipment at either its terminals or in its aircraft, Emery can forward refrigerated items only if they are packed in dry ice and then only in accordance with the regulations for hazardous materials spceified in Title 49 of the Code of Federal Regulations. Most other allowable hazardous material are handled by Emery with the exception of Class "A" explosives, poisons, and fissionable radioactive materials.

Discussions with Emery corporate managers indicates that they would not be likely to apply to receive hazardous material exemptions from the Department of Transportation in order to fly unique Navy cargo. They did express the ability to guarantee movement of cargo in the event of labor disputes. Historical references of no work stoppages during strikes were cited. Emery managers expressed willingness to handle classified material. Observations at local terminals revealed the presence of high security cages for valuable shipments. Primary concern was directed to shipment value in excess of ten dollars per pound. Maintaining full insurance requirements for both passengers and cargo, corporate managers found the liability requirements for loss and damage in transit in QUICKTRANS contracts to be quite reasonable and acceptable. Emery corporate headquarters has

cited a very low, and decreasing, damage and loss in transit rate and has indicated a claim resolution timeframe of from two to four weeks.

Emery headquarters has indicated the likelihood of improved service timeliness and possible Saturday deliveries at selected locations without charge in the event of significant Navy business. In both instances the requirements for large volumes of cargo, possible cross subsidization, and maintenance of a minimum profit incentive were mentioned in order for such services to be realized.

Emery maintains a cost structure based on shipment weight and zoning of origin-destination pairs (see Appendixes J and K). These are increased by fees for special handling, special products, and special services and are reduced by large shipment weight discounts.

3. Airlift Capabilities

Not possessing a certificate of public convenience and necessity, Emery recently abandoned its licensing as an all cargo scheduled airline in favor of licensing as an air freight forwarder. This certification eases some of the more stringent aircraft safety requirements and facilitates movement of cargo on other carriers' aircraft or vehicles when in-house capabilities are fully utilized.

Emery currently maintains a fleet of sixty-three aircraft of which twenty-six are wholly owned B727's of United States registry. The remaining thirty-seven aircraft, mostly DC8's, are chartered or leased either permanently or temporarily from other carriers. Most of the aircraft in the fleet are completely self-sufficient in operations and Emery maintains facilities for self-sufficiency in maintenance, refueling, and servicing. The size of the fleet is completely flexible and is dependent on demand of services. While none of the Emery-owned aircraft

are designated to the CRAF, most of the other carriers chartering to Emery have done so.

The B727's and DC8's used almost exclusivley in the Emery air fleet are configured as side-loaded, rolling container cargo aircraft. While the Air Force 463L pallet (108" by 88") can be loaded, the larger, more popular and space efficient 125" by 88" netted pallets and closed containers are used. The maximum dimension across one of the containers is approximately 140" thus limiting outsize cargo. Very thin cargo (approximately 4" maximum) of greater lengths can be placed in aircraft between containers and the interior aircraft bulkheads. Corporate management has indicated that, on an exception basis, Emery can and will charter aircraft or vehicles as needed to handle outsize cargo. Again, the profit incentive was cited as the factor to be satisfied.

The scheduling of aircraft within the Emery system is extremely flexible. With 70,000 miles of flight operations per day, changes are generally made daily in some portion or other. The driving factors are customers' demands for delivery times.

4. Terminaling Capabilities

One hundred and thirty-nine terminals of various size are operated by Emery at or near airports throughout the country. These serve as consolidated receiving and shipping points for metropolitan areas and outlying areas served by the terminal office. The local terminal is the focal point for build-up and break-down of containerized shipments. While the terminal can preposition containers at a customer location if necessary, preference is given for either pick-up of material in break-bulk or pick-up on customer pallets for later return. This preference is based on the desire to preclude customer warehousing of containers

and to provide more effective utilization of containers during sort and pack operations at the terminal.

Each evening, all cargo is containerized and trucked to the nearby airport for air shipment to the hub terminal. Excess shipment quantities are either trucked to the nearest airport for airlift to the hub, or are consigned to other carriers for shipment to Emery offices nearest the shipment destinations.

The hub terminal at the Dayton, Ohio airport consists of a quarter million square foot full-service warehouse situated on a 2.2 million square foot ramp. All system shipments are sorted at the hub each evening, are re-containerized and are loaded aboard fifty waiting aircraft for shipment to local terminals. The sort operation is accomplished on a near fully automated conveyor system which utilizes postal zip codes for directing the shipments. Total sort and re-distribution time for all system shipments is approximately five to six hours per day. The hub terminal warehouse also serves as the system air operations scheduling center, weather control center and headquarters for the EMCON system.

5. Land Haul Capabilities

Emery maintains a fleet of over fifteen hundred radio dispatched trucks nationwide. Approximately sixty-nine are owned, most of which are smaller pick-up and delivery vans and trucks. The remainder are mostly forty and forty-two foot tractor trailers which are leased. The entire fleet has the appropriate Interstate Commerce Commission and local state Department of Transportation licenses and operating authorizations. The Emery system is dependent upon the truck fleet to pick-up and deliver customer shipment locally, to transfer daily local shipment excesses to other Emery terminals or to other carriers, and to provide service to extended areas.

The rate base for shipment by truck is the same as for air shipment. However, Emery's air freight forwarder certificate generally requires that all cargo must travel in the air during some portion of the movement. There are several exceptions relaxing that requirement and permitting exclusive land-haul trucking. These include weather which prevents aircraft departure, mechanical problems preventing aircraft departure, outsize and hazardous material cargo and system excesses.

C. SUMMARY

In summary, Emery Worldwide represents a commercial air cargo transportation alternative to the QUICKTRANS system. With pick-up and delivery services, special handling capabilities, broad area of coverage, and second day delivery it is an excellent model for comparison and analysis with QUICKTRANS.

V. COMPARISON AND ANALYSIS

In this chapter the contractual and legal requirements of the components of the QUICKTRANS system are compared and analyzed with the service characteristics and capabilities of the representative air cargo carrier.

A. GENERAL

Several considerations span the entire scope of the transporation systems. Primary among these are assurances of service, material applicability and liability, and the reporting and management of information. Whereas the QUICKTRANS contracts assure transportation service for one year periods of time, the alternative system is continuously in place and would be employed by the Navy on a demand-need basis. This does not preclude the establishment of a contract expressing agreement regarding special considerations for the handling of Navy cargo. Assurance of continuance of service despite possible labor disruptions is provided both by the nature of the marketplace in which the carrier competes and by historical experiences with the situation in which service was not interrupted.

Of the myriad different types of high-priority cargo that must be moved by the Navy, most can be transported by the alternative system. All general cargo, classified materials and most hazardous materials can be accomodated. Excluded from commercial air carriage by law are Class A explosives, certain poisons and certain types of radioactive material. Excluded by aircraft and aircraft container size limitations are all outsize cargoes - those which exceed one hundred and forty inches in any one dimension. Liability

acceptance for loss in transit or damage in transit of cargo or passengers is assured by the maintenance of commercial insurance. The levels of insurance coverage are in consonance with the legal requirements for air carriers. Additionally, management of the commercial alternative has displayed ready acceptance of the QUICKTRANS standard for the establishment of liability.

The reporting of operational and management information by the commercial alternative is limited to accumulated dimensional and scheduling information on the individual shipper's cargo. The significant reduction in reporting is coincident with the shifting of operational control and material responsibility to the carrier.

E. AIRLIFT

The Federal Aviation Administration requirements are partially fulfilled by the commercial representative. While all utilized aircraft are of United States registry and many are suitable for designation for designation to the CRAF, it is unlikely that the commercial carrier would be willing to register the aircraft in CRAF in order to obtain Navy business. This is due primarily to the increased administrative workload and regulations attendant to maintaining CRAF-designated aircraft. Additionally, the representative commercial alternative has not received, nor requested, a certificate of public convenience and necessity. Because of this, the commercial alternative is certified as an air freight forwarder and not as a scheduled air cargo carrier. Most of the distinction between those two certifications is of little consequence especially when viewing the recent air industry deregulation and the planned disestablishment of the certificating agency, the Civil Aeronautics Board, in the near future.

Navy contractual requirements include the provision of full range aircraft support, service and maintenance and Navy controlled scheduling. The carrier will maintain and revise schedules as necessary to direct or re-direct to locations and within time deadlines as demanded by the customer. The representative carrier has contracted for all required aircraft services and maintenance and is self-supporting at all air terminal locations.

Regarding the provisions for couriers or escorts, the commercial carrier has two extra seats available in the cockpit of each aircraft. Each is equipped with all of the required safety and convenience equipment. For accomodating air freight, the interior of the carrier's aircraft can be easily converted to accept the 463L pallets if it were required. However, the use of the larger and standard 125" by 88" open pallets and closed containers allows for better space utilization within the aircraft.

The most important requirement is the provision of airlift service capability to all locations where the Navy could possibly ship or receive high-priority cargo. Most of these locations are currently serviced by the commercial carrier with full airlift capability. However, a few locations are considered as extended point pick-up and delivery locations and are serviced by truck to the nearest commercial air terminal maintained by the carrier. At these locations pick-up is provided on an as-needed basis. Delivery to these extended point locations would occur at intervals outside of the deadlines currently mandated for Navy high-priority cargo movement. The carrier's management has indicated that sufficent increases in volume to make extended delivery points more profitable would provide scheduling changes for more frequent cargo delivery.

C. TERMINALING

All of the equipment and service requirements for aircraft handling, servicing, and positioning by the terminaling activity have been contracted for by the commercial carrier. The carrier, however, does maintain all material handling equipment which is necessary for the internal warehouse movement of cargo as well as larger handling equipment for the loading and unloading of trucks and aircraft. The commercial carrier also maintains ramp movement equipment and cargo scales.

The representative carrier has the capability to warehouse limited amounts of cargo for short periods of time. However, the usual daily operations allow for the immediate delivery of cargo to the customer, and most terminals rarely have to warehouse. Refrigerated equipment is not available at any of the terminal facilities. Subsequently, the overnight warehousing of perishable cargoes cannot be accomplished. Again the carrier's management has indicated that sufficient demand for refigeration equipment would cause it to be placed where needed.

As indicated in the airlift section, with single carrier responsibility, the identification for and the assumption of liability for losses or damage to cargo in transit is simplified. Adequate insurance is provided by the commercial carrier for all of its handled cargo regardless of its location within the system. Maintenance of a quality control program to ensure smooth material flow, efficient capacity utilization and cargo accountability is in place in the commercial alternative's system.

Cargo cannot enter into the commercial system at any time as it can into the QUICKTRANS system. The commercial system generally provides one pick-up per day per customer. This requires user activities to establish a holding area

for all high-priority cargo. Daily cargo inputs would be located in this holding area and the carrier notified for pick-up. All daily inputs subsequently received would have to be held until the following day for pick-up. Deadlines for notification and pick-up vary at each location in the country. These deadlines allow for sufficient transit time to move all material to the national hub each night for sorting and reshipment.

With the shifting of responsibility for scheduling, tracking, and expediting to the commercial carrier, the requirement for the QUICKTRANS INFOSYSTEM and COMNET is replaced with the carrier's EMCON system. This on-line, real-time, data communications network provides immediate cargo manifest location and schedule. This system can be accessed by user activities' data terminals without charge.

Finally, the terminaling capability of the commercial alternative provides no established interface with other components of the Defense Tranportation System (DTS). Material exiting DTS components can be readily placed into the commercial service. Cargo in the commercial system can be re-directed to a terminaling activity of DTS components. This may or may not be accomplished with some loss of timeliness. If re-direction information can be provided before sorting at the hub, the revised destination can be reached within the cargo's original timeframe. Later re-direction information can delay delivery up to twenty-four hours.

D. LANDHAUL

The commercial carrier has established truck routes and schedules to provide service to all locations nationwide. Pick-up and delivery for all customers is provided by truck. These services are maintained by a fleet of sufficient and various size trucks that are either owned or leased by the

carrier. All fleet trucks are properly certified by the Interstate Commerce Commisssion and the various state Departments of Transportation

E. SUMMARY

The representative commercial air cargo system provided, in essence, for most of the requirements for the movement of Navy high-priority cargo. These are, however, met in a form which is different from the existing QUICKTRANS system. The marked difference in these forms, from the user's perspective, is one of control. In the QUICKTRANS system total control and information is maintained on all material from initial entry into the system until final delivery. In the commercial alternative system, service is limited to the tranportation of material from one point to another with access to some information concerning the movement. Any decision emanating from the comparison and analysis of these two systems must consider this conceptual difference between them. Accordingly, appropriate priorities must be assigned to control, cost, and effectiveness in order to select the desired transportation alternative.

VI. COSTS AND EFFECTIVENESS

An evaluation of two or more alternatives normally leads to a cost/effectiveness analysis where either cost or effectiveness is fixed at a specific point or level and the remaining standard is utilized as the basis for selection of the most desirable alternative (i.e. least cost or most effective). However, when both effectiveness and cost are unequal, there are no all-purpose criteria for ranking alternatives and, unfortunately, this is the situation encountered when comparing QUICKTRANS and Emery. As a result of this inability to directly compare the two systems, this study will compare the cost and effectiveness evaluations of Emery and QUICKTRANS in three separate stages. Stage one will involve the development of the total annual cost models for each system and then the development of each of the systems annual cost. Following this will be an effectiveness evaluation of each system using the modal choice selection criteria established by the Dogulas Aircraft Company in 1978 [Ref. 30] as the indicators of effectiveness. The final stage will be to compare the results of these evaluations and analyses, identify the areas where the the two systems differ, and then, if applicable, ascertain the degree to which these differences can be attributed to the differences in cost [Ref. 31].

A. COST

The methodologies which are utilized to determine the total annual cost, which would be incurred by the government, for the transportation of identical cargoes between the same origin-destination (O-D) pairs are distinctly

different for each of the systems under analysis. Because of these differences it is necessary to develop individually the total annual cost models for each system and then compare the costs which result from the utilization of the models with the results of the systems' effectiveness evaluations. Emery's methods of cost computation and resulting cost models will be described first and will be followed by a similiar description of the methods and cost modeling utilized by QUICKTRANS.

1. Emery

The total annual cost figure which will be determined for Emery will be the total annual cargo transportation cost of door-to-door service from all points of origin to all points of final destination required to fulfill present Navy high priority cargo transportation requirements within the continental United States.

a. Cost Components

Emery determines cost based on the number of pounds per shipment transported between specific O-D pairs [Ref. 27]. The actual rate assessed will vary according to the expediency of delivery (different delivery schedules are available with differing rates), the weight shipped (rate breaks are provided for shipments in excess of ninety-nine pounds as indicated in Appendix K), the rate zones in which the O-D pairs are located (Emery uses six rate zones), or a combination of two or more of these items.

It is assumed that the rate charges are set based not only on these speed of delivery and weight-distance relationships but also on frequency of shipments between the specific O-D pairs. This assumption is based upon the different rate structures which apply to cities within the same geographical area. An example of this is

demonstrated when shipping material weighing in excess of 99 pounds from the west coast to the east coast. If a shipment originated from either Oakland or Norton AFB, California destined for Kingsbay, Georgia the rate scale which would be utilized would be 654 (see Appendix J). If, however, a shipment originates at NAS Lemoore, California destined for the same location the rate scale would be 655 and thus result in a higher per pound charge (see Appendix K) even though the air mileages between all points are very similiar.

Additional consideration must also be given to discounts in determining total cost. Discussions with Emery representatives indicate discounts vary amoung the various customers of Emery based on the total quantity and weight shipped during the course of a normal business year. The actual discount rate applied is the result of negotiations between the customer and shipper as there are no discounts or procedures for discounts specified in Emery's rate guide. For the purpose of this study, a fifty percent discount rate per shipment will be assumed.[2]

b. Cost Model

Based on the previously mentioned information and relationships, the total annual cost which would be incurred by the government if Emery was exclusively utilized to replace QUICKTRANS would be the annual sum of the individual daily charges incurred for cargo shipments between each point of origin and destination, less a fifty percent

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[2] This discount rate is based upon telephone interviews between LT C. J. Weber and Mr. John J. Kramer of Emery on 22 September 1983 and LCDR A. D. HOLDEN and Mr. D. Hakes of NAVSUP on 5 October 1983. Both interviews resulted in the determination that the current maximum discount rate enjoyed by volume customers of Emery was in the vicinity of fifty percent.

discount rate. Mathematically, this cost equation would be stated as indicated in Figure 6.1.

$$TAC = .5 \sum_{i=1}^{N} (R)(W)$$

Where:

TAC = The total annual point-to-point transportation cost for all O-D pairs
.5 = The assumed discount rate
R = The appropriate rate for weight of shipment (The Day-2 service option rate is utilized)
W = The actual weight shipped between O-D pairs in pound
N = The number of O-D pairs required to match the cargo movement with the QUICKTRANS system

Figure 6.1 Emery Cost Model

The Emery Day-2 Service option rate was selected for cost modeling because this Emery service is the least expensive standard service and meets or exceeds the delivery time requirements specified by UMMIPS for all TP classifications of material.

c. Cost Development

In order to calculate total annual cost utilizing the equation contained in Figure 6.1, Appendixes D, J, and K must be utilized. These Appendixes contain QUICKTRANS' ten month O-D pair cargo movement average, O-D pair rate scale, and the shipment cost per pound per rate scale.

Since Emery does not operate its system just once a month, Appendix D must be adjusted to reflect the quantity of cargo which is transported between O-D pairs on

a daily basis. For simplicity and ease of computation, Appendix D was assumed to represent a thirty day month and it was further assumed that this thirty day month was composed of four seven day weeks plus two additional work days. This provides twenty-two working days and eight non-working days per month. Using these assumptions the tonnage indicated in Appendix D divided by twenty-two yields the number of tons moved per work day if the mode operates five days per week. Similiar calculations could provide the quantity of material which could be moved between O-D pairs on a daily or a six day work week basis.

Although the main QUICKTRANS air terminals are served seven days a week in the current system, the frequency of deliveries to and from these terminals actually control the overall cargo movement frequency. Because of this end distribution control feature the actual number of days which cargo moves between the various O-D pairs must be develcped.

By analyzing Appendixes C (Truck Delivery Schedule) and H (Airlift Service Schedule), the transportation mode which most restricts the movement of cargo between specific O-D pairs can be identified as well as the number of days which that mode operates within any given week. As a result of this analysis, Appendix M indicates the number of days cargo actually moves between O-D pairs. Again, for simplicity, the five day work week has been selected for cost modeling because this particular frequency dominates the actual cargo movements contained in Appendix M. Based on the distribution frequency of five days per week Appendix N indicates the average quantity of cargo shipped between O-D pairs on a normal operating day. Utilizing Appendixes N, J, K and the equation contained in Figure 6.1, Appendix O shows the total annual cost of moving all cargo by Emery's air freight system. This cost is $380,345 per day,

$8,367,590 per month, or $100,411,080 per year. Using the fifty percent discount the total annual cost would be $50,205,540.

It must be noted that this total annual cost is overstated. First, by using average cost, it is assumed that cargo is shipped every day to every possible destination. This has a severe impact on cost because it reduces a few large shipments to many smaller ones and concurrently raises cost because it costs more to ship the many smaller quantities than one large shipment. Second, the costs include movement of ALL cargo by air. This includes movements from relatively close locations where air shipment is impossible and air movement of cargo which need not move by air.

d. Qualification of Emery Cost

It must be noted, however, for shipments under 500 miles a truck can usually deliver goods in less time than other modes [Ref. 23] and usually for less cost. Therefore, it would be neither prudent nor cost efficient to transport all items by air without first taking into consideration the distances involved between the various O-D pairs.

An examination of Appendix L will reveal a number of geographic locations which contains clusters of cities which are all within a radius of 500 miles of each other. Therefore in order to reduce cost, utilization of dedicated truck systems similiar to those currently utilized in the QUICKTRANS system would be required. These truck systems could either be independently contracted routes or more appropriately, incorporated in the Emery system, if possible.

The projected cost of operating these dedicated trucks will be determined by taking the average per mile rate of the truck routes contained in Appendix C and multiplying this by the actual miles between O-D pairs. The assumption underlying this calculation is that overall, the actual total cost should average to an equivalent figure since the composite of all routes would most likely involve similiar firm fixed prices because of the similiar mileage and truck requirements.

Based upon the above mentioned requirements and calculations, Appendix P lists those truck routes which would be required in addition to the current trucking system to supplement the Emery airfreight service and their projected annual cost of $4.3 million. Appendix Q indicates a revised airlift cost of $265,521 per day, $5,841,462 per month, or $70,097,544 per year. Using the fifty percent discount, a total annual airlift cost of $35,048,772 is obtained. By combining the cost of the dedicated truck routes (both those currently utilized and those proposed) with the revised Emery air-freight service requirements, a new total cost is obtained. This new total annual cost is $39.3 million. The equation utilized to arrive at this figure is shown in Figure 6.2

2. QUICKTRANS

The total annual cost which will be determined for QUICKTRANS will be the total annual cargo transportation cost for the shipment of Navy high priority cargo between all QUICKTRANS O-D pairs within the contential United States.

$$TAC = .5 \sum_{i=1}^{N} (R)(W) + \sum_{ia=1}^{Na} Fp$$

Where:

TAC = The total annual point-to-point transportation cost for all O-D pairs
.5 = The assumed discount rate
R = The appropriate rate for weight of shipment (The Day-2 service option rate is utilized)
W = The actual weight shipped between O-D pairs in pounds
N = The number of O-D pairs required to match the cargo movement with the QUICKTRANS system
Na = The number of dedicated truck routes
Fp = The firm fixed price per route

Figure 6.2 Combined Cost Model

a. Components

QUICKTRANS determines its total annual cost based on the sum of the annual cost for each of the segments which make up the system, namely, airlift, terminaling, and land-haul services. Since each segment of the QUICKTRANS system may be composed of one or more contracts and each contract has more that one cost component it is necessary to compute the total annual cost of each segment separately. Each of the contract cost components and the resulting cost models are discussed in the following subsections.

(1) Land-haul Cost Component and Model. The QUICKTRANS Land-haul segment is described in detail in Chapter III. For the purposes of cost modeling, it is sufficient to remember that this segment is composed of independently operated trucking firms operating between specific points. The total annual costs of this segment are therefore composed of the sum of the firm fixed rates charged for each point-to-point delivery performed and, when

applicable, either per stop or security service charges. Figure 6.3 displays the equation necessary to derive total annual cost for this segment.

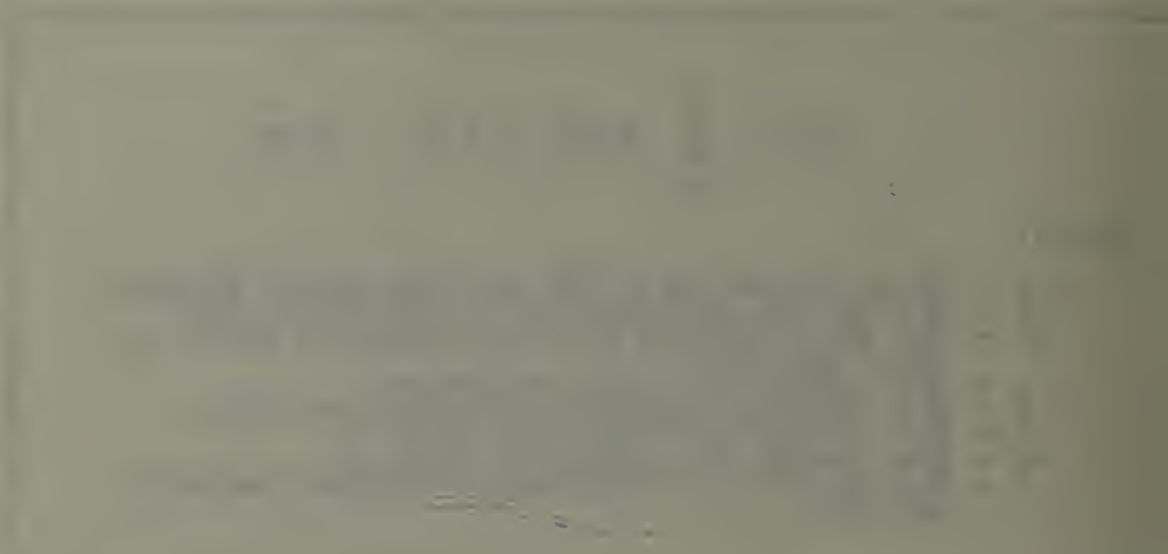
$$TCL = \sum_{i=1}^{N} Rt(X) + S(Y) + Sc(Z)$$

Where:

TCL = Total annual cost for the land-haul segment
N = The number of dedicated truck contracts
Rt = The rate charges for the specific point-to-point service
X = The number of trips performed
S = The charges assessed per stop per trip
Y = The number of stops per trip
Sc = The charge for security service
Z = The number of trips which require security service

Figure 6.3 Land-Haul Cost Model

(2) Airlift Cost Components and Model. The total annual cost of the second segment of QUICKTRANS, Airlift Services, involves payment for the number of statute air miles flown, the number of directed landings performed, and the fuel utilized in the execution of the contract. The number of statute air miles to be flown between O-D pairs are specified in the contract and the contractor is paid at the rate of $5.0667 per air statute mile flown. The estimated number of directed landings are also stated in the contract and the contractor is paid $250.00 per directed landing accomplished. Fuel, on the other hand, is either reimbursed after the fact or iniatially paid for by the government. Table II shows the type, cost, percentage breakdown, and total cost of the fuel utilized by QUICKTRANS for fiscal year 1982 and is assumed to be representative of



current fiscal year costs because demand for QUICKTRANS air services and the cost of fuel have been relatively stable.

TABLE II

QUICKTRANS Annual Fuel Cost

Type	Percent	Gallons	Cost Per Gal	Total Cost
JP5	.6048	4,445,561.23	1.08	$4,801,206.13
JP4	.2922	2,147,805.87	1.00	2,147,805.87
COMM	.1030	757,098.89	.88	666,247.02
TOT	1.0000	7,350,465.99	--	$7,615,259.02

Using the aforementioned relationships, Figure 6.4 displays the equation necessary to compute total annual cost of the airlift porition of the QUICKTRANS system.

$$TCA = \sum_{i=1}^{N} F(5.0667) + D(250) + G(C)$$

Where:

TAC = The total annual cost for the airlift segment
N = The number of point-to-point airlift requirements
F = The specified number of statute air miles between points
D = The number of directed landings
G = The number of gallons of fuel consumed
C = The appropriate cost per gallon of fuel

Figure 6.4 Airlift Cost Model

(3) Terminaling Cost Components and Model. This segment is unlike the previously discussed QUICKTRANS segments in that there are no separate costs for individual operational components. However, there is a cost component which covers all operational requirements and a second component, an award fee, which is contingent upon the quality of the operational performance. Since there are two separately paid components within the terminaling contract the total cost of this QUICKTRANS segment is the sum of the contract award cost plus any quarterly award fee authorized. Figure 6.5 contains the cost equations for annual terminaling cost.

$$TCT = Fp + \sum_{i=1}^{N} Af$$

Where:

TCT = The total annual cost of the terminaling service
Fp = The negoitated fixed price contract award cost
Af = The quarterly determined award fee
N = The number of quarters in which an award fee was authorized

Figure 6.5 Terminaling Cost Model

b. Total Cost Development

Since the total annual cost of the system is the sum of the cost of the individual segments then the total annual cost is $40 million. Figure 6.6 illustrates the mathematical equation utilized to determine total annual cost for QUICKTRANS.

$$TAC = TCL + TCA + TCT$$

Where:

TAC = Total annual cost for the QUICKTRANS system
TCI = Total annual cost for the land-haul segment
TCA = Total annual cost for the airlift segment
TCT = Total annual cost for the terminaling segment

Figure 6.6 QUICKTRANS Cost Model

The actual development of QUICKTRANS's total annual cost will not be undertaken due to the enormous quantity of data involved. It is considered sufficient that all the individual cost components and their relationships in the total annual cost computation have been identified. The costs which will be utilized as QUICKTRANS total annual cost will be those which have been provided by the QUICKTRANS system manager at NAVMTO. The cost of the airlift, terminaling, and land-haul segments of the QUICKTRANS system were $25.5, $11.0, and $3.5 million, respectively, for fiscal year 1982.

E. EFFECTIVENESS

As previously indicated in this chapter, this study will evaluate the effectiveness of both QUICKTRANS and Emery by first evaluating each system by the commercial modal choice selection criteria identified in the Douglas Aircraft Company study [Ref. 30] and then comparing the results of this evaluation to determine which is most effective in meeting these criteria. The purpose of this study was to identify air transportation trends and requirements for the 1990's. A substantial number of commercial firms were surveyed to ascertain their criteria for modal selection.

The primary reason that QUICKTRANS effectiveness criteria were not utilized as a basis for this evaluation is that some of QUICKTRANS requirements are peculiar to this system only and are not found in commercial alternatives.

1. Discussion of Criteria

Table III lists those selection criteria which at least thiry percent of the survey respondents indicated as important in selection of a carrier. The mean importance score represents the average of all respondents ratings for each criterion out of a possible score of 100. It should be noted that those criteria which are separated by approximately one or fewer points can be interchanged as far as relative degree of importance is concerned.

Sixteen of the eighteen criteria contained in Table III will be briefly discussed in terms of both content and rationale. Criteria two and sixteen will not be considered in the evaluation of effectiveness. Criterion two (freight charges) has been previously taken into consideration under the topic of total cost and criterion sixteen (future rate increases due to higher fuel cost) has been eliminated because it is considered no longer applicable. In 1976, when Douglas' survey was conducted, the country had just endured a major shortage in petroleum products and the resulting skyrocketing fuel costs. Due to the proximity of the foregoing events and the survey, it is believed that there was a cause and effect relationship which resulted in criterion sixteen. Therefore, criterion sixteen is deemed not applicable in 1983 since fuel prices have remained relatively stable for a period of years.

Criterion one, consistent, on-time pickup and delivery, involves the degree of reliability with which the carrier maintains its published pickup and delivery schedule or adheres to the schedule arranged by the shipper. Users

TABLE III

Modal Choice Selection Criteria

	Selection Criteria	Mean Score
1.	Consistent, On-time Pickup and Delivery	92.4
2.	Freight charges	79.8
3.	Time-in-Transit	79.1
4.	Points Served by Mode, Including Routing Authority	73.9
5.	Frequency of Service	72.1
6.	Loss and/or Damage History	69.2
7.	Timely Acceptance of Shipments of all Sizes	65.6
8.	Door-to-Door Delivery	61.9
9.	Shipment Tracing Capability	61.8
10.	Prompt Claim Service	60.8
11.	Adaptability to Specific Company Needs	55.5
12.	Availability of Standard Equipment	50.6
13.	Serviceability of Off-Line Points	50.2
14.	Local Reputation of Carrier Firm	47.1
15.	Availability of Special Equipment or Services	41.0
16.	Possible Future Rate Increases by Mode Due to Higher Fuel Cost	36.2
17.	Information Services Offered	35.0
18.	Consolidation and/or Breakbulk Services	33.9

of commercial transportation services are concerned with the dependability of carriers since their ultimate success or failure may hinge on the carriers' ability to either deliver their products to end users when desired or deliver material resources to their firms to meet operational requirements,

when required. If a carrier's service is not reliable, then the results could be lost sales, production delays, or other such profit or service impacting consequences.

Time-in-transit is the total time that elapses from the time the shipper makes the goods available for dispatch until the carrier delivers the goods to the specified destination. This criterion is important to the shipper in that it may allow the firm to reduce the range and/or depth of inventory maintained at various locations or alleviate the need to carry any more inventory than that which is absolutely necessary to maintain operations between deliveries. If transit time is swift enough, then it allows for transfer of good or materials in sufficient time to prohibit or minimize down time of equipment or stock outages from impacting on operations, both of which impact on cost.

Criterion four is concerned with accessibility which is the ability of the carrier to provide either service between all the points of origin and destination desired by the shipper or over a specific route which links various O-D pairs. Also included in this criterion is control of the routing authority. It is more desirable for a carrier to control the routing of its cargo rather than to rely on another firm to perform such a function in order to ensure the most expeditious routing. A carrier who can provide the desired O-D pair service and controls the routing of transportation vehicles between those O-D pairs can tailor their service to the needs of the customers or can at least guarentee delivery when or where required. This most likely would not be the case if a carrier had to rely on another firm which controlled the routing of its cargo.

Frequency of service (how often the carrier transits the required O-D pairs) is important to the shipper in determining the quantity of inventory to maintain and in providing the ability to receive or deliver materials when required or desired.

Criterion six, loss or damage history, reflects the carriers ability, based upon its past performance, to deliver cargo in the same condition as it was rendered to the carrier. High loss or damage in route increases the cost to the shipper as such loss or damage must be replaced or repaired and this cost must, at least initially, be born by the shipper. Additionally, it delays or prohibits receipt of required materials which might result in lost sales, production delays, equipment failures, etc.

Timely acceptance of shipments of all sizes is concerned with the capability of the carriers. Capability refers to the ability of the carrier to provide the equipment and facilities required, at any time, for the movement of desired cargo. Preference is given to those carriers which provide the greatest flexibility. The period of time or the size of the cargo which may require emergency shipment is not always predictable, and any delay encountered in the shipment of this material could results in any of the previously mentioned undesired results.

Door-to-door delivery, criterion eight, involves the carrier physically picking-up cargo at the shipper's location and delivering it at its final destination. If a carrier provides such services, then the shipper need not acquire transportation vehicles to perform such functions. This avoidance of acquisition cost is particularly important if the shipper has no other use for the equipment other than this delivery function.

The shipment tracing capability includes the ability of the carrier to pinpoint the location of any item anywhere in transit from the point of origin to the point of destination. This service provides the ability to re-route cargoes, when necessary; to fulfill urgent unanticipated requirements; to ensure that cargoes will arrive when planned or expected; and to either expedite or suspend a

shipment prior to arrival at final destination if it is in the best interest of the shipper. All of these actions could save the shipper money or improve its service capabilities.

Criterion ten, prompt claim service, covers the carrier's ability to expeditiously process claims for loss or damaged items. A carrier which can promptly process such claims is considered more valuable to a shipper than one who cannot provide such a service. If a carrier promptly settles claims, then shippers do not have to invest their capital for a longer period than absolutely necessary in cargo replacements to meet their customers' needs.

Adaptability refers to the ability of the carrier to change its promuglated procedures to meet special circumstances of the shipper. If the carrier can provide such services, then it is unnecessary for the shipper to expend the time, expense, and effort necessary to find a carrier who does provide the desired services in emergency situations.

Criterion twelve refers to those equipments which a shipper would normally expect a carrier to include in its inventory of equipment. This ensures smooth uninterrupted cargo movement because the carrier does not have to stop and procure the equipment necessary to process the cargo through its transportation network.

Serviceability of off-line points includes the ability of the carrier to pick-up or deliver to points not within the normally expected transportation networks. Not all of the shipper's normal sources or product users are located along the most frequerntly used transportation routes; therefore, in order to provide adequate service to those points, either a carrier must serve the area or the shipper must invest in the transportation equipment to fulfill the service need or forego the business

relationship. The last two alternatives clearly cost the shipper more in terms of investment cost or profits foregone than is necessary if a carrier provides the service.

Criterion fourteen, local reputation, refers to the carrier's professional standing in the local community based on the type and quality of service it is known to provide to its customers. A carrier with a high reputation is less of a business risk to a shipper than one which may offer lower cost but has a questionable service, delivery, or loss and damage reputation.

Criterion fifteen involves the carrier's ability to either obtain or provide, from its own resources, special equipment necessary to meet its customer's demands and to provide any other services required by the shipper. If a shipper has unusually configured products or products which require special handling or equipment, then the shipper wants a carrier who either has the capability or can provide the capability on relatively short notice since any delay can result in additional cost or loss of revenues.

Information services include the ability to provide insight into better ways to meet the shippers needs, knowledge abouth other modal links, and specific carrier capabilities. Also included is the ability to provide information on connecting services, time schedules, special transportation requirements, or restrictions. Any of this information provided prior to shipment could result in smoother cargo movement, prevention of unanticipated interruptions, and avoidance of additional costs.

The final criterion, consolidation or breakbulk services, refers to the carriers' ability to consolidate or collect small shipments to form larger quantities in order to realize lower transportation rates and the separation of consolidated, bulk loads into individual, smaller shipments for delivery to ultimate destinations. Both of these services serve to reduce the operating cost of the shipper.

2. Effectiveness Model

In order to compare QUICKTRANS' and Emery's effectiveness it is first necessary to determine the degree to which the organization fulfills the criterion requirements listed in Table III and then compare the results of these evaluations. To aid in this evaluation, the algorithm displayed in Figure 6.7 has been developed.

		Performance Satisfaction of Criterion		
		H	M	L
Priority	H	x	x	x
of	M	x	x	x
Criterion	L	x	x	x

Where:

HH = 9 HM = 7 HL = -6
MH = 6 MM = 4 ML = -2
LH = 3 LM = 1 LL = 0

Figure 6.7 Effectiveness Algorithm

The left vertical column of the algorithm contains the relative priorities of the criterion. By priority, it is meant the relative degree of importance that a shipper places on that criterion when selecting a carrier. The criteria listed in Table II have been divided into three priority levels. Those criteria which a shipper would consider to be of primary importance and, most likely, immediately exclude a carrier from further consideration if the criterion were not rated favorably are given the priority of

HIGH. Those criteria which are important to a shipper but do not necessarily dictate exclusion from consideration if rated unfavorably are given the priority of MEDIUM. The remaining criteria are considered to be relatively low in importance in carrier selection and are given the priority of LOW.

Those items in Table II which had a mean importance score of seventy or greater (criteria 1 through 5) were considered to be in the high priority category. Each of these items directly impacts on the carrier's physical ability to transport cargo from point of origin to final destination in a timely manner. Those items which have mean importance scores of less than seventy but greater than fifty (criteria 6 through 13) are considered to be of medium priority. These items do not directly impact on the carrier's transportation abilities but do impact on the quality of service which the carrier can provide. The remaining criteria with a mean importance score of less than fifty (criteria 14 through 18) are considered to be of low priority in the carrier selection process. These criteria are considered nice to have but would not severly impact on a shipper selecting a carrier if the higher rated criteria were rated satisfactorily.

The top horizontal row indicates the degree to which the system under study fulfills the requirements specified within each criterion. The results of this evaluation are also rated as either HIGH, MEDIUM, or LOW. A rating of high indicates that the system completely fulfills the requirements specified for that criterion. A medium rating indicates that the system does meet the requirements of the criterion, however, not as completely as it could have been met. If a system does not adequately fulfill the criterion requirements or does not provide the service then it is rated LOW on that criterion.

The criteria effectiveness scores range from a high of 9 to a low of -6. This range was specifically selected to allow the final mean score to fall clearly within one of the final effectiveness categories. Actual criterion effectiveness will be determined by matrix algebra. Criterion effectiveness will equal the product of priority of criterion and performance satisfaction of the criterion. The possible outcomes of such an equation are listed in the lower portion of Figure 6.7. The first letter designates the priortiy of the criterion and the second letter represents the degree to which the carrier fulfilled the criterion requirements. A penalty mechnanism was incorporated to penalize a system for rating poorly on any criterion. This penalty varies with the relative priority of the criterion. It is felt that a system should be penalized more for performing poorly on a high priority criterion than on a lower criterion priority, therefore, performing poorly on a high priority criterion is scored -6, on a mid-level criterion -2, and on a low criterion 0. An example of this process would be a criterion which was considered as being of HIGH importance would receive a first letter of H, however, if the carrier received a poor rating in fulfilling that criterion's requirements then the second letter would be L. The resulting carrier effectiveness score for that criterion would be a -6 (penalized) since the carrier rated poorly on a criterion which is considered important in the selection of a carrier.

The overall effectiveness rating will be determined by summing the individual scores achieved by the system on each of the selected criteria and then determining the mean score of all evaluated criteria. The equation which depicts this process is illustrated in Figure 6.8. If a system's mean score ranges between 6 and 3.6, then it would be considered as being highly effective. Likewise, if the

$$E = \sum_{i=1}^{N} I/N$$

Where:

E = The overall effectives rating
N = The number of criteria utilized
I = The individual criterion scores

Figure 6.8 Effectiveness Rating Model

score fell between 3.59 and 0, then the system would be considered to be adequately effective. If, however, the score is less than zero, then the system would be considered to be non-effective.

The evaluation of the system's ability to fulfill the criterion requirements and the degree to which they are judged to do so is based upon the authors' interpretations of the personal observations experienced, literature researched, and analysis of the information provided by the systems managers and contracting authorities which were accumulated and synthesized throughout the course of this study.[3]

3. QUICKTRANS

Table IV displays the results of the QUICKTRANS effectiveness analysis. A discussion of the reasoning employed and the factors considered in the analysis are provided in the succeeding paragraphs.

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[3] Although this is a subjective judgement in nature, it is believed that the results of this evaluation methodology accurately reflects the ability of the systems to fulfill the criteria requirements selected as the basis of evaluation due to the quantity and quality of information which was available for analysis.

TABLE IV

QUICKTRANS Effectiveness Ratings

Criterion	Priority	Rating	Score
1	H	H	9
3	H	M	7
4	H	M	7
5	H	M	7
6	M	L	-2
7	M	H	6
8	M	L	-2
9	M	H	6
10	M	L	-2
11	M	H	6
12	M	H	6
13	M	L	-2
14	L	M	1
15	L	H	3
17	L	M	1
18	L	M	1

Total Score.............................. 52

Effectiveness Rating................... 3.25

The QUICKTRANS system rates high on criterion one, consistent, on-time pickup and delivery. This rating is predicated on its explicit set of schedules contained in References 20, 25, and the individual standing route orders. Appendix C shows the detail of the airlift schedule with flight frequency, patterns, and arrival or departures times specified and Reference 20 even contains the amount of

turnaround time (ground time) allowed at each terminal location. Similiar detail is contained in the individual standing route orders. Reference 25 contains explicit reporting requirements to ensure compliance with these schedules and the penalities to be assessed for noncompliance.

Criterion three, time-in-transit, cannot be rated high because of the front and rear distribution control features of the present system. Appendix P indicates that although the main air terminals are served seven days a week the frequency of cargo receipt or distribution by these points is normally only five or fewer days per week. This inconsistency of transist times causes unnecessary delays in cargo movement. If the system is intended to move cargo only five days a week, then it should be so structured. The reason for the daily movement of cargo between main air terminals when final distribution is performed only five or fewer days per week is not clearly understood. It is clearly not a time sensitive delivery requirement. It may, however, be an aircraft airlift requirement. Because of this inconsistency, a rating of medium is assigned.

Criterion four is rated as being medium. Although QUICKTRANS links all major naval activities it does not link all smaller activities or major manufacturing points. High priority cargo originating from or destined to these points must usually pass through some other transportation network before or after connecting with the QUICKTRANS system. This inability to service all military and essential manufacturing points is the primary reason for the low rating.

Frequency of service is rated as average. This rating is linked to the time-in-transit rating since both involve the physical receipt of cargo. The inability of the system to provide service seven days a week or service end points more than once a day are considered drawbacks of the system and the reason for the medium rating.

The criterion concerning loss or damage of material in-transit is rated low. QUICKTRANS' loss or damage record is not known because of its discrepancy reporting system and lack of specific compensation procedures. Within the QUICKTRANS system the cargo receiving activity must contact the shipping activity to report non-delivery or damage, not the QUICKTRANS activity. This "end around" system prevents detailed records from being kept regarding loss or damage history. Additionally, due to the uniqueness of some of the military cargo (bought on cost plus basis) the cost is not determinable until the completion of the contract. There are no procedures for placing a dollar value per pound shipped or for compensating loss on any other basis since the government is a self insurer.

Criterion seven (timely acceptence of shipments) is rated high. QUICKTRANS personnel are on call 24 hours per day to respond to emergency shipments. All normal cargo movement equipment is permanently located at all terminaling activities. Although cargo is expected to be picked-up or delivered within specified operating hours, special arrangements can be made for the customer to drop off shipments at any time at any terminal location.

A rating of low is given to QUICKTRANS' ability to provide door-to-door delivery to final destination. QUICKTRANS links with the Navy's local supply transportation system and it this system which is utilized to complete the distribution function. Deliveries from Charleston to Kingsbay can be utilized as an example. QUICKTRANS delivers once a week when the normal supply center delivery system does not operate, and the remaining deliveries are made by that system.

QUICKTRANS receives a high rating on their shipment tracing capability. The computer system which is utilized and the corresponding network of data input/output terminals allows for pinpointing of cargo anywhere within the system.

The claims processing ability of QUICKTRANS is rated as being low. The normal claims processing time is between one and two months. There are some claims, because of their unique nature, which take considerably longer to process.

Criterion eleven (adapability) and criterion twelve (standard equipment availability) are rated very high since QUICKTRANS is a Navy controlled system. Flights can be added, cancelled, or redirected with minimum notice. Terminal personnel can be notified of scheduled changes and trucking concerns contacted for more or fewer pickup or delivery runs with little disruptive impact. All contracts utilized for QUICKTRANS contain provisions which allow for maximum system flexibility. All equipment which is required to handle Navy unique cargo is permanently located at all QUICKTRANS terminals.

QUICKTRANS' ability to service off-line points is rated low. This system is designed to service only specifically identified high usage points. Any point not on the network route must be serviced using some other transportation network which interconnects with the QUICKTRANS system.

Local reputation is given a rating of medium. Through conversations with Naval personnel, the QUICKTRANS system is viewed with mixed results. There are those personnel who condemn the system and would rather use any other cargo transportation system to transport their high priority cargo. Then there are personnel who view QUICKTRANS as being adequate to meet their needs. It is because of this mixed review that a medium rating is given. Special equipment availability, criterion fifteen, receives a high rating due to the reasons previously mentioned. This includes being a Navy controlled system and having known customers and their cargo shipment requirements.

The final two criteria, seventeen and eighteen, receive a medium rating. QUICKTRANS has the ability to provide some information on interconnecting modes of transportation; however, this capability is limited. Information on cargo restrictions and special transportation requirements is readily available. The cargo consolidation or breakbulk service is provided by the very nature of the system, however, not in the same context of the requirement. This service is provided by the terminal location and not the final destination.

4. Emery

Table V displays the results of the Emery effectiveness analysis. As with the QUICKTRANS evaluation, a discussion of the reasoning employed and the factors considered are discussed in the succeeding paragraphs.

Emery rates high on the first five criteria considered in Table III. Emery arranges their pickup and delivery schedules to meet their customers' needs. Normally, this involves one pickup per day and this is usually at the end of the normal working day to ensure all outbound cargo is included. Delivery time is also specified and is normally early in the business day since Emery transports and sorts their cargo during the night time hours.

Time-in-transit can range from one to three days depending upon the transportation service option selected by the customer. Pickup and delivery frequency is also based on the delivery option selected and can take place up to six days per week, if desired.

Criterion four, points served, receives its high rating because of the vast transportation network utilized by Emery. This network covers all major metropolitian centers and many smaller size cities and towns. All Naval installations are served by the Emery system.

TABLE V

Emery Effectiveness Ratings

Criterion	Priority	Rating	Score
1	H	H	9
3	H	H	9
4	H	H	9
5	H	H	9
6	M	H	6
7	M	M	4
8	M	H	6
9	M	H	6
10	M	H	6
11	M	H	6
12	M	H	6
13	M	H	6
14	L	H	3
15	L	M	1
17	L	H	3
18	L	H	3
Total Score............................... 92			
Effectiveness Rating.................. 5.75			

Emery has experienced a low and declining loss and damage record, particulary since they have shifted their air transportation from using common carriers to their own aircraft and commenced utilization of their hub facilities in Dayton. This has facilitated their direct control over all aspects of cargo handling and has resulted in a consistent decrease in the actual loss or damage being experienced.

A rating of medium is given to Emery for their ability to accept shipments of all sizes at any time. Emery is constrained in the size of the shipments which they can normally accept by the size of the aircraft normally utilized. However, with advanced notice, Emery will provide the proper size aircraft to fulfill the customer's needs at additional costs.

Emery also receives a high rating on criteria eight through fourteen. Door-to-door delivery is provided for all cargo shipments. This includes pickup at the point of origin and delivery to the FINAL destination. Emery's EMCON system provides instantaneous shipment tracing and expediting information twenty-four hours a day and the customer may link with this system by either telephone or through their own data terminals.

Criterion ten, prompt claim service, received a high rating due to Emery's history of normally processing claims for lost or damaged shipments within a period of two to four weeks. Criterion eleven, adaptability, was rated high because of Emery's constant monitoring of cargo movements. Emery monitors customer demand on a daily basis and makes changes in flights, schedules, etc. to meet those demands. Emery, like QUICKTRANS, permanently maintains all the necessary cargo moving equipment at their air terminal and cargo sorting locations and therefore receives a high rating for standard equipment availability.

Serviceability of off-line points is rated high because of Emery's capability to rent or charter trucks to expand their fleet to pick-up or deliver wherever needed. Emery's reputation is excellent. They have a strong reputation as a fast, reliable cargo carrier. This includes their ability to pickup and deliver cargo when expected and in good condition. Their concept of service to the customer dictates their schedules, services, and attitudes displayed by their employees.

Emery's ability to provide special equipment and services is somewhat restricted. Federal laws and regulations restrict the types of cargo which they may transport. This includes limitations on hazardous materials which are currently carried by QUICKTRANS. They are also restricted, by design, in their cargo handling equipment. Special equipment not utilized in normal daily operations is not maintained at their air terminal locations due to the limited requirement for such equipment. Emery's normal cargo load can be handled effectively by standard equipment. They are, however, more than willing to provide special services, at additional cost, if it is within their capabilities. Because of the aforementioned restrictions, Emery is given a rating of medium on this criterion.

A very high rating is given to the final two criteria. This rating is predicated on Emery's speciality as an air freight forwarder. As an air freight forwarder, Emery's initial service function was to provide information services to customers for air transportation needs and to provide consolidation or breakbulk services. They have continued to excel in both of these areas today.

C. COMPARISON OF EMERY AND QUICKTRANS

Table VI displays the criteria effectiveness ratings attained by both Emery and QUICKTRANS along with their final mean effectiveness rating. Also included in the table is a column displaying which criteria that they differed on and which system scored highest on each criterion. Based on this study, Emery achieves the highest effectiveness rating.

When costs are compared, Emery has the highest total annual cost when all cargo is moved between all O-D pairs by air. However, when a more reasonable approach is taken, a combination of Emery air and dedicated trucks results in a

TABLE VI

Comparison Effectiveness Ratings

Criterion	Priority	QUICKTRANS	Emery	Difference
1	H	H	H	-
3	H	M	H	xE
4	H	M	H	xE
5	H	M	H	xE
6	M	L	H	xE
7	M	H	M	xQ
8	M	L	H	xE
9	M	H	H	-
10	M	L	H	xE
11	M	H	H	-
12	M	H	H	-
13	M	L	H	xE
14	L	M	H	xE
15	L	H	M	xQ
17	L	M	H	xE
18	L	M	H	xE
Total Score		52	92	
Effectiveness Rating		3.25	5.75	

lower total annual cost. The current QUICKTRANS system has a current total annual cost of $40 million and the Emery air and dedicated truck system has a total annual cost of $39.3 million.

Caution must be used when comparing total annual cost. Emery's cost are those which would be incurred by the Federal Government for one years service. QUICKTRANS' total annual cost figure does not represent all the costs incurred

by the government for one years operations. This figure represents the amount which NAVMTO pays the carriers involved in the system. For comparison, ALL costs of operating the QUICKTRANS system must be included. This includes, but is not limited to, the cost of all administrative personnel associated with QUICKTRANS at NAVMTO, that portion of NAVMTO's general, administrative and overhead costs attributed to those personnel, apprortiate facilities and equipment rental and maintenance costs associated with the facilities and equipment provided to the contractor under the contracts, annual solicitation and administrative costs incurred at the various contracting activities, costs incurred by military and commercial activities for transportation of cargoes to and from QUICKTRANS terminals or cargo receipt points, and the cost of military personnel utilized in fueling, positioning, etc. of aircraft at military bases or used in cargo handling.

Additional consideration must be given to the inflation of Emery's cost. Based on NAVMTO's classifications of AIR and DVT, DVT (that cargo which need not go by air) is being transported by air. Emery's air transportation cost could be reduced considerably by transporting DVT material by more appropriate means.

Based on the foregoing analysis it appears that the Emery air and dedicated truck system is not only slightly more cost efficient than the current QUICKTRANS system, it is also a more effevtive system.

VII. CONTRACTING FOR THE ALTERNATIVE

The previous comparisons and analyses attest to the viability of the commercial alternative to QUICKTRANS and the advantages of shifting to it. There are, however, several differences and problems in the way in which the alternative system can satisfy the requirement to transport Navy high-priority cargo. In addition to resolving these differences and problems there are also a few barriers to the selection of the commercial alternative which must be removed. The alleviation of all of these problems forms the basis for several desired objectives which must be addressed prior to contracting for the commercial alternative.

A. OBJECTIVES

The attainment of the objectives listed below is crucial. Failure to realize them will either preclude selection of the alternative system or will provide service which is operationally incomplete or cost inefficient.

1. The requirement that the provider of transportation of military cargo must possess a certificate of public necessity and convenience must be removed. Such a requirement is competitively restrictive in that it only allows for the consideration of scheduled air carriers and excludes from consideration other potential offerors in the competitive marketplace, namely, air freight forwarders. Ostensibly, this requirement is to ensure that only those offerors who conform to all Federal Aviation Administration air safety standards and requirements will be considered. If the desire is to ensure that the contractor meet these FAA requirements, then it should be so stated. The

requirement for a CAB certificate has been obviated by the deregulation of air cargo carriers.

2. The requirement that the transportation provider register all eligible aircraft in the CRAF must likewise be eliminated. This requirement is similarly restrictive in that it includes for consideration only those scheduled air carriers which own CRAF eligible aircraft. Due to leasing and chartering arrangements for aircraft by non-air carriers, they may not possess the legal right to designate the aircraft they use to the CRAF.

3. In order to stimulate sufficient competitive activity for the contracting of this function there must be a positive effort at reducing operational control, administrative control, and reporting requirements. As cited by Jaggard and Cartwright, from the contractor's viewpoint, the greatest disincenitves to contracting with the federal government are the "bureaucratic and sovereign induced requirements". These disincentives were mentioned by more that sixty-five percent of all contractors surveyed. Difficulties were noted primarily with over-regulation and control, government interference with business, and requirements for excessive paperwork [Ref. 32].

4. The successful offeror should be incentivized to provide transportation capabilities for as many types of Navy cargo as possible. While legal constraints exist to prohibit movement of several types of hazardous material, many other types of Navy cargo cannot be currently carried by commercial contractors due to the materials' physical dimensions or configurations. Expansion to owned or leased equipment to transport and handle these items serves the dual purpose of simplifying Navy administrative requirements by remaining with a singularly responsible carrier for all high-priority cargo transportation and enhancing the contractor's profit motive. This motive satisfaction is the

largest single business objective of federal government contractors [Ref. 32].

5. The representative commercial alternative selected in this thesis provides the most extensive service available to points in the continental United States. Even with that service not all points enjoy two day service. Included in these points are a few smaller Naval installations and government contracted manufacturing plants which supply the Navy with high-priority material. Contracting incentives must be provided to ensure two day transportation capability for all required activities and plants.

6. Similarly, contracting incentives must be provided to remove or reduce the high premium charge associated with Saturday pick-up and delivery so that all points serviced may enjoy six days per week transportation availability.

7. A primary premise for considering an alternative system to QUICKTRANS was the reduction or avoidance of cost with a system of comparable operational effectiveness. With the knowlege that our selected representative offers as much as a fifty per cent discount to its large commercial accounts, and knowing that the business generated by any one of those accounts is miniscule when compared to the Navy requirements, two things become immediately evident. Firstly, the application of rates by the carrier allows considerable flexibility for capacity utilization and contribution to profit. Secondly, recognizing the above, the guarantee of cargo for movement provides the opportunity of and excellent bargaining position for cost containment. Primary objectives in this position are a flat rate base and uniform discount rate for all Navy material transported. Targets for these are a base equivalent to Emery's 5,000 pound and over per shipment rate and a 50 percent or better discount rate.

E. CONTRACTING PLAN

In order to achieve the above listed objectives, a four part plan is offered. The first part is designed to remove the barriers to competition while the remaining parts collectively support meeting all of the other objectives.

1. In order to provide maximum competitive involvement, release or waiver of the certification and CRAF registration requirements must be obtained. In view of the recent deregulation of the airline industry, disestablishment of the Civil Aeronautics Board planned for the very near future, and increased federal government focus on competition enhancement, it is assumed that circumvention of these requirements is rather easily achievable.

2. The design of the contract for high-priority cargo transportation should include the provision for a multi-year award. By giving smaller air carriers and freight forwarders the opportunity to spread capital expansion costs over time, greater numbers of offerors will be induced to compete for the award. This is a primary point in the objective for cost reduction.

3. Since the precise levels of usage and origin-destination pair utilizations cannot be accurately determined in advance, an indefinite quantity type contract (IQTC) is indicated. While a requirements type of contract might be considered, the assigning of guarantees and limits in an IQTC was considered more appropriate since these parameters contribute to the capacity utilization planning process, and hence, the opportunity for reduction of cost. These are more fully addressed below. The construction of this contract should include clauses identifying authorized shipping and receiving activities as well as hours of operation for pick-up and delivery for each. Additionally, rate bases and terms of discount must be addressed. These latter

items are most likely matters for negotiation. The ideal government position for this is a fixed rate and discount for all movement nationwide. This negotiation position is enhanced by the absolute and relative size of the Navy requirement and by the guarantees provided below.

4. Data accumulated by the Navy Material Transportation Office on QUICKTRANS utilization indicates that annual system demand is extremely stable and exhibits a one to two per cent annual growth rate. Variations in monthly utilizations, and utilizations between origin-destination pairs, are somewhat larger. Accordingly, the determination of contract specification for the commercial alternative is readily determinable. The total annual cargo weight expected to be shipped is equal to the previous year's QUICKTRANS total movement weight plus growth adjustment and less the weight of those materials that the contractor cannot move. Included in these are the prohibited hazardous materials and the outsize cargoes not likely to be incentivized. In keeping with IQTC requirements, a guaranteed minimum usage of ninety per cent and a limiting maximum of one hundred and ten per cent of the total estimate is considered reasonable. These parameters will assist in the negotiation process for the flat rate base and discount rate by allowing the contractor to efficiently estimate his required capacity. Whether the usage is estimated as a system total or is broken down to origin-destination pair shipments bears on the risk assumed by the contractor; the former being more beneficial to the government and the latter to the contractor. This is another area appropriate for negotiation.

VIII. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. SUMMARY

By analysis of the system and comparison with its standards and requirements, QUICKTRANS is performing all of its functions adequately. The system is designed to provide direct transportation service for most Navy material sources and users. Excluded are a few smaller Naval activities, a few Navy contracted original equipment manufacturing plants, and Defense Logistic Agency stock points. It has been determined that much cargo which does not require airlift is directed to the QUICKTRANS operation for movement. This suggests an operating inefficiency of overcapacity and the attendant cost inefficiency of premium payment for a service that is not required. Additionally, due to route scheduling, not all locations enjoy the same frequency of service. For some activities this translates to the receipt of high-priority cargo outside of the timeframes established by UMMIPS for Transportation Priority One and Two movements.

During the life of the QUICKTRANS system the commercial air cargo industry has fully developed, with marked maturation within the past few years. The industry has grown in both overall capacity and in the numbers of competitors in the marketplace. While most industry members compete regionally, internationally, or in segmented markets, several vie for business throughout the nation. With this situation there is the opportunity of placing the Navy's high-priority cargo movement requirements into the commercial arena and thus allowing natural market forces to improve effectiveness and reduce costs through the competitive process. By appropriate incentivization and innovative contracting this process can be enhanced.

B. CONCLUSIONS

Based on the comparisons of capabilities with requirements, the modeling for cost efficiency and operational effectiveness, and subsequent analysis, the authors have come to two primary conclusions. One relates to the recognition of fact and the other to the recognition of the requirement for change.

1. With respect to cost and effectiveness, the primary research question has been answered. There is a viable commercial alternative to the QUICKTRANS system. This alternative is capable of meeting the movement requirements for most of the Navy's high priority cargo.

2. In order to engage this alternative three things must occur:

   a. There must be a change in the way in which the Navy views what, why, and how it transports high-priority cargo. The thinking must shift from a "Navy owned" cargo transportation system to a transportation service that is purchased.

   b. Vis-a-vis this change in thinking, there must evolve a change in the formulation of requirements which reflects that way of thinking.

   c. The process must change to accomodate the new requirements and the new environment.

C. RECOMMENDATIONS

While it appears that the commercial alternative is completely feasible, a much more detailed analysis is required. Much of the information necessary to formulate this thesis has been caveated, assumed, synthesized or estimated. The inability to obtain most of this information is based on inaccessability or lack of collection. It is

specifically recommended that additional research be accomplished to obtain data and information in the following areas:

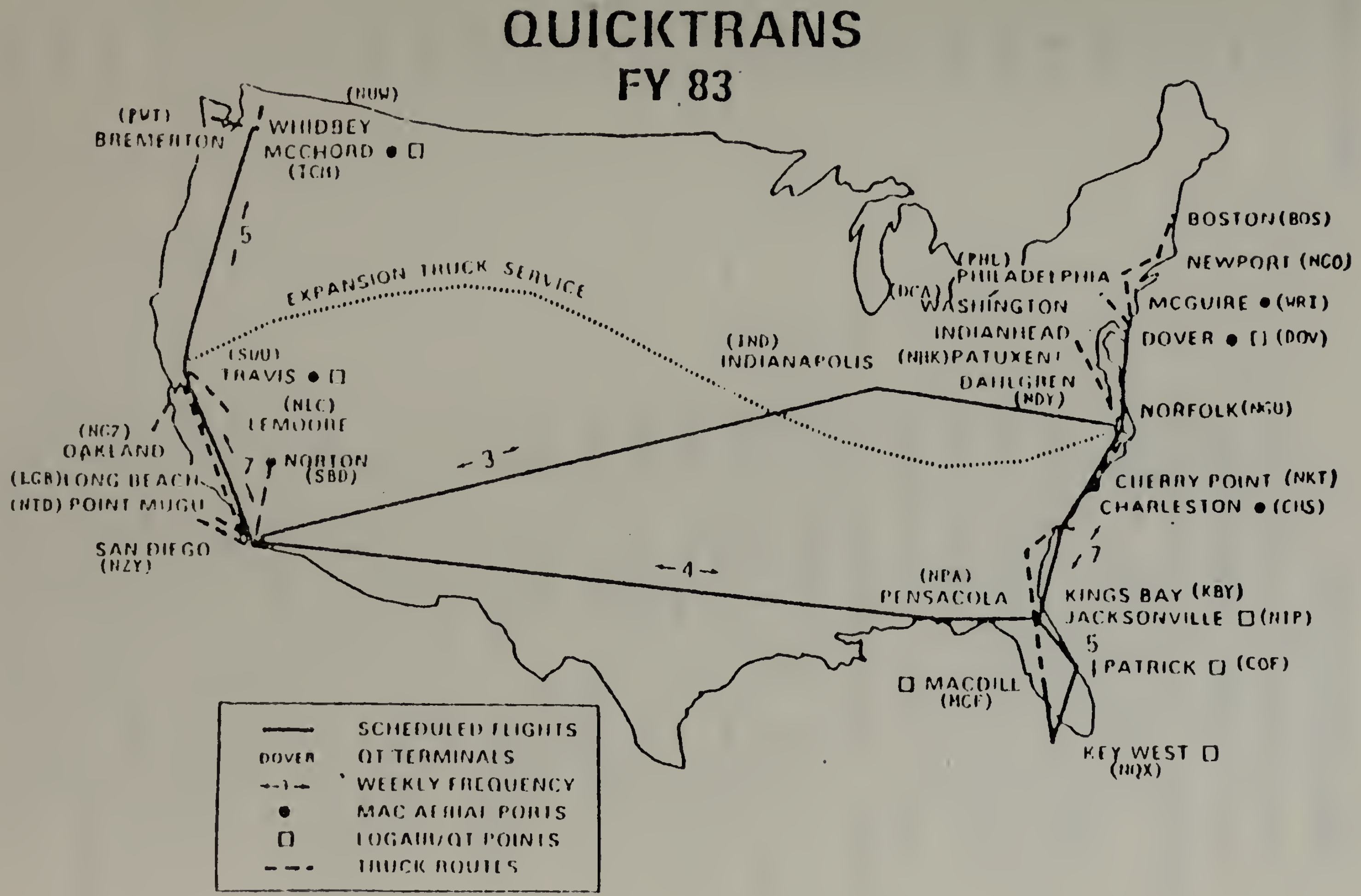
1. Identification of total system costs for the administration of the QUICKTRANS contracts, including: civilian and military payrolls, administration costs, data processing costs, command and control network costs, and incidental and indirect costs.

2. Determination of volumes of cargoes, or methods of estimating volumes, moving between all origin-destination pairs in the QUICKTRANS system for both Transportation Priority One and Two material.

3. Examination of the requirement of airlift eligibility for Transportation Priority Two material.

4. Performance of a full review of the timeframe requirements for delivery of Transportation Priority One and Two material.

APPENDIX A
QUICKTRANS ROUTE STRUCTURE



APPENDIX B

ORIGIN/DESTINATION ABBREVIATIONS

ABBREVIATION	ORIGIN/DESTINATION
BCS	*NB Boston, Massachusetts
NCO	*NB Newport, Rhode Island
GCN	*NSB New London, Connecticut
DOV	*+Dover AFB, Delaware
WRI	*McGuire AFB, New Jersey
PHL	*NB Philadelphia, Pennsylvania
IND	*+NAF Indianapolis, Indiana
NGU	*+NAS Norfolk, Virginia
NKT	*MCAS Cherry Point, North Carolina
NHK	*NAS Paxtuent River, Maryland
DCA	*NAF Washington, D.C.
CHS	*+Charleston AFB, South Carolina
KEY	*NSB Kings Bay, Georgia
NIP	*+NAS Jacksonville, Florida
NPA	*+NAS Pensacola, Florida
CCF	*Patrick AFB, Florida
NQX	*NAS Keywest, Florida
NZY	*+NSC San Diego, California
NYL	*MCAS Yuma, Arizona
SED	*Norton AFB, California
LGB	*NSC Long Beach, California
NTD	*NAS Point Magu, California
SUU	*+Travis AFB, California
NIC	*NAS Lemoore, California
NGZ	*NSC Oakland, California
PWT	*NSC Bremerton, Washington
NUW	*NAS Whibey Island, Washington
TCM	*+McCord AFB, Washington
PVD	Providence, Rhode Island

ABBREVIATION	ORIGIN/DESTINATION
BDL	Bradley INT, Connecticut
RDU	Raleigh-Durham, North Carolina
MCF	McDill AFB, Florida
TRE	Trenton, New Jersey
JAX	Jacksonville, Florida
MCO	Orlando, Florida
MIA	Miami, Florida
SFO	San Francisco, California
SEA	Seattle - Tacoma, Washington
FAT	Fresno, California
SBA	Santa Barbara, California

*QUICKTRANS Service Points

+QUICKTRANS Airport Terminal Operations

SOURCE: Military Standard Transportation and Movement Procedures (MILSTAMP), DOD 4500.32R, Vol. I

APPENDIX C

DEDICATED TRUCK SYSTEMS

O-D PAIR	DAYS A WEEK	MILEAGE ONE-WAY	COST ONE-WAY	ROUND TRIP	PER STOP	SSS
TCM-NUW	M-F	108	$142.00	$284.00	x	$25.00
TCM-PWT	M-F	41	$137.00	$274.00	$8.00	$25.00
SUU-NZY	M-F	515	x	$759.00	$18.00	$25.00
NZY-NTD	M-F	614	x	$606.48	$25.00	x
SUU-NGZ	Su-Sa	47	$97.50	$195.00	x	$25.00
SUU-NLC	M-F	215	$190.00	x	x	$25.00
DOV-BCS	M-F	379	$464.00	x	$25.00*	x
DOV-WRI	M-F	111	$190.00	x	$5.00	$25.00
WRI-DOV			$205.00	x	$5.00	$25.00
NGU-DCA	M-F	186	x	$430.00	x	$25.00
NGU-NHK	M-F	185	$380.00	x	x	x
NIP-NPA	M-F	384	$265.70	$531.40	x	x
CHS-KEY	Su	221	$390.00	x	x	$15.00
SBD-NZY	M-Sa	107	x	$325.00	x	x
NGU-NKT	Su-F	172	$201.84	$278.40+ $334.08+	x	$25.00

*after second stop

+Monday through Friday

++Weekends and Holidays

x not applicable

SOURCE: Uniform Tender of Rates and/or Charges for Transportation Services on file at NAVMTO, Norflok Va. and Official Table of Distances NAVSO P-2471(Rev 1-82)

APPENDIX D

ORIGIN CARGO DISTRIBUTION REPORT

ORGIN/DEST		BOS	NCO	GON	DOV	WRI	PHL	IND
BOS	AIR	x	.2	4.2	.7	x	.4	.3
	DVT	x	x	1.3	x	x	x	.4
NCO	AIR	.3	x	1.5	.8	x	.1	.1
	DVT	x	x	x	x	x	x	.1
GON	AIR	5.5	.4	x	1.8	x	1.0	.3
	DVT	1.6	.1	x	x	x	x	.4
DOV	AIR	2.9	.4	3.2	x	.6	4.2	1.6
	DVT	x	x	x	x	x	x	.4
WRI	AIR	.5	x	x	1.0	x	1.5	x
	DVT	x	x	x	x	x	x	x
PHL	AIR	2.6	.4	1.4	6.3	.2	x	.3
	DVT	x	x	x	x	x	x	.1
IND	AIR	1.0	x	.3	1.3	.1	.5	x
	DVT	.3	x	x	.1	x	.1	x
NGU	AIR	24.0	7.8	34.6	65.6	12.7	24.6	4.6
	DVT	x	x	x	.6	x	x	3.3
NKT	AIR	1.9	x	1.1	4.8	.3	.7	.8
	DVT	x	x	x	x	x	x	.3
NHK	AIR	1.3	x	.3	2.5	.5	.8	.4
	DVT	x	x	x	x	x	x	.2
ICA	AIR	x	x	.6	1.0	.5	.2	.5
	DVT	x	x	x	.3	x	x	x
CHS	AIR	20.4	3.4	15.2	8.1	.2	5.7	6.2
	DVT	6.3	.5	2.3	2.2	.2	.9	1.8
NIP	AIR	5.6	.3	.5	18.4	.6	3.8	2.3
	DVT	1.0	x	.1	1.3	.3	1.6	.3
NPA	AIR	.8	x	1.8	2.2	1.0	1.6	.3
	DVT	.6	.2	.4	.1	.1	.5	.2
COF	AIR	.4	.1	.5	.4	x	x	.2
	DVT	x	x	x	x	x	x	x
NQX	AIR	.1	x	.1	.1	x	.1	.1
	DVT	x	x	x	x	.1	x	x
NZY	AIR	3.4	2.0	4.3	9.6	.9	4.1	5.3
	DVT	1.1	.2	.8	2.3	.1	.6	4.4
SBD	AIR	x	x	x	x	x	x	x
	DVT	.9	x	x	x	x	x	.3
IGB	AIR	.9	.5	.4	1.3	x	.9	1.1
	DVT	.1	.1	.3	.1	x	.2	.3
NTD	AIR	x	.1	x	x	x	3.5	.3
	DVT	x	.1	x	x	x	1.9	.3
SUU	AIR	10.3	1.1	6.5	15.0	1.6	6.6	4.5
	DVT	3.8	.1	.5	4.7	.2	1.3	2.3
NLC	AIR	.4	x	x	x	.1	x	.2
	DVT	.3	x	x	x	x	x	x
NGZ	AIR	3.4	.6	1.8	2.7	.3	5.9	.4
	DVT	.3	x	.5	.9	x	2.0	.8
PWT	AIR	1.6	.4	2.7	1.6	.1	1.1	.5
	DVT	.4	.5	.7	.4	x	.4	.5
NUW	AIR	x	x	.1	1.6	x	.1	2.1
	DVT	x	x	x	.3	.2	x	.5
TCM	AIR	1.5	1.2	2.6	1.5	x	1.2	.3
	DVT	.2	.1	.1	.5	x	.4	x
CTH	AIR	x	x	x	x	x	x	x
	DVT	x	x	x	x	x	x	x
TOT	PRI 1	58.00	10.94	53.87	107.21	13.32	47.25	21.53
TOT	PRI 2	30.80	7.96	29.83	41.09	6.38	21.35	11.17
TOT	DVT	16.90	1.90	7.00	13.80	1.20	9.90	16.90
TOT	DEST	105.70	20.80	90.70	162.10	20.90	78.50	49.60

ORIGIN/DEST		NGU	NKT	NHK	DCA	CHS	KBY	NIP
BOS	AIR	16.4	1.9	.4	.1	24.9	1.2	1.7
	DVT	.1	x	x	x	1.6	x	.3
NCO	AIR	5.3	.2	x	.3	2.2	x	.1
	DVT	x	x	x	x	.5	x	x
GON	AIR	20.6	.1	.1	1.2	6.2	.9	2.9
	DVT	x	x	x	x	1.2	x	.4
DOV	AIR	61.7	8.7	2.8	1.6	21.5	.6	7.0
	DVT	x	x	x	x	2.9	x	1.4
WRI	AIR	6.0	1.2	.8	.4	.1	x	1.5
	DVT	x	x	.1	x	.1	x	.3
PHL	AIR	22.7	1.4	.5	.9	8.5	.6	8.9
	DVT	x	x	x	x	.7	x	1.8
IND	AIR	16.7	.9	.8	.5	7.0	.1	1.1
	DVT	1.9	.6	.1	x	.5	x	.2
NGU	AIR	x	67.8	24.8	29.1	141.1	9.1	88.9
	DVT	x	.5	x	x	33.3	.4	48.4
NKT	AIR	50.8	x	4.9	3.2	1.3	x	7.2
	DVT	.3	x	x	x	.1	x	2.5
NHK	AIR	32.7	7.5	x	x	2.6	x	4.4
	DVT	x	x	x	x	.7	.1	1.9
DCA	AIR	10.6	8.7	x	x	17.9	.2	.2
	DVT	2.0	x	x	x	.3	x	x
CHS	AIR	92.9	2.0	1.5	3.4	x	x	10.9
	DVT	23.5	.4	.6	.6	x	x	5.1
NIP	AIR	70.6	10.5	5.4	.7	7.8	.3	x
	DVT	12.3	1.7	1.2	.4	x	x	x
NPA	AIR	37.7	7.5	2.7	.6	8.6	x	30.7
	DVT	5.6	4.5	1.0	.3	x	x	x
COF	AIR	1.2	.9	x	.2	1.3	x	.1
	DVT	.1	x	x	x	x	x	2.7
NQX	AIR	2.0	1.4	.1	x	.1	.1	8.0
	DVT	2.2	.5	.1	x	x	x	1.5
NZY	AIR	61.5	13.0	2.6	4.4	18.0	.4	14.6
	DVT	16.9	5.1	.5	1.2	2.9	x	4.7
SBD	AIR	.1	.2	.1	x	x	x	.2
	DVT	.1	x	x	x	x	x	x
LGB	AIR	12.6	3.4	1.2	.6	5.1	x	2.3
	DVT	3.1	1.2	x	.2	.6	.1	.3
NTD	AIR	8.7	.7	.3	.2	.4	.1	.9
	DVT	2.0	x	.1	x	.2	x	.1
SUU	AIR	69.4	13.8	5.3	5.5	25.4	.6	28.9
	DVT	23.5	2.6	.9	1.6	1.5	x	4.6
NLC	AIR	1.9	.4	.5	.1	.2	x	5.6
	DVT	2.4	x	x	x	x	x	.6
NGZ	AIR	19.0	1.3	.9	.9	8.2	.2	2.9
	DVT	5.5	.7	.2	.3	2.5	x	1.7
PWT	AIR	5.5	x	.1	.7	4.0	x	.3
	DVT	.9	x	x	.2	.1	x	x
NUW	AIR	5.9	.7	.5	.1	x	x	12.8
	DVT	1.3	.5	x	x	x	x	3.5
TCM	AIR	7.8	.1	.1	1.0	13.4	.2	1.7
	DVT	1.9	x	.1	.2	.6	x	x
OTH	AIR	x	x	x	x	x	x	1.9
	DVT	x	x	x	x	x	x	x
TOT	PRI 1	424.71	102.04	36.54	25.57	192.58	3.00	177.22
TOT	PRI 2	215.59	52.26	19.86	30.13	133.22	11.60	68.48
TOT	DVT	105.60	18.30	4.90	5.00	50.30	.60	82.00
TOT	DEST	745.90	172.60	61.30	60.70	376.10	15.20	327.70

ORGIN/DEST		NPA	CCF	NQX	NZY	NYL	SBD	LGB
BOS	AIR	.4	.2	x	2.2	x	x	1.6
	DVT	x	x	.1	.4	x	x	.6
NCO	AIR	.4	.1	x	1.1	x	x	.3
	DVT	x	.1	x	.3	x	x	.2
GON	AIR	.2	.9	x	1.6	x	x	.3
	DVT	.1	.1	x	.3	x	x	.4
DOV	AIR	2.1	.2	.2	7.5	x	1.0	3.0
	DVT	.6	x	.2	1.3	x	x	.8
WRI	AIR	1.0	x	x	1.3	x	.2	.1
	DVT	.3	x	.1	.8	x	x	.5
PHL	AIR	1.2	x	.1	6.2	x	.3	3.4
	DVT	.2	x	x	1.2	x	x	.7
IND	AIR	.4	.4	.2	6.9	x	.4	2.2
	DVT	.1	x	x	2.0	x	x	.8
NGU	AIR	25.5	2.4	7.2	85.1	x	6.6	28.6
	DVT	14.5	1.9	2.9	37.2	x	x	13.7
NKT	AIR	5.2	.3	1.1	18.5	x	3.9	8.4
	DVT	2.1	x	.4	8.0	x	.1	1.8
NHK	AIR	1.8	x	.3	3.4	x	x	1.3
	DVT	1.3	x	.3	3.3	x	x	1.2
DCA	AIR	.6	x	.2	1.1	x	.7	.3
	DVT	x	x	.3	.2	x	x	.1
CHS	AIR	9.6	9.1	1.0	12.4	x	.9	8.4
	DVT	.1	x	x	3.1	x	x	3.0
NIP	AIR	55.6	x	8.8	12.8	x	.3	5.8
	DVT	2.7	x	.7	3.4	x	x	2.3
NPA	AIR	x	1.5	2.7	13.9	x	2.5	5.8
	DVT	x	x	x	5.5	x	x	.8
COF	AIR	.4	x	.1	.2	x	x	.9
	DVT	x	x	x	.1	x	x	x
NQX	AIR	1.8	.9	x	.3	x	x	.4
	DVT	x	x	x	x	x	x	x
NZY	AIR	14.2	1.8	1.0	x	18.6	32.1	21.2
	DVT	5.2	1.2	.4	x	1.6	x	1.5
SBD	AIR	.1	x	x	44.4	x	x	3.1
	DVT	.2	x	x	.1	x	x	x
LGB	AIR	3.4	.1	.1	16.8	x	2.6	x
	DVT	.8	x	x	2.5	x	x	x
NTD	AIR	.5	x	.2	7.1	x	4.5	.7
	DVT	.1	x	x	9.9	x	x	1.5
SUU	AIR	10.4	.6	1.6	122.9	x	4.8	20.7
	DVT	2.4	x	.8	1.4	x	x	.2
NLC	AIR	.3	.2	x	5.8	x	x	.5
	DVT	.1	x	x	.2	x	x	.1
NGZ	AIR	1.4	.4	.3	63.3	x	3.4	41.2
	DVT	.5	.1	.1	x	x	x	.4
PWT	AIR	.2	.2	.2	14.1	x	x	6.1
	DVT	x	x	.1	.1	x	x	.1
NUW	AIR	.8	x	x	5.6	x	.2	1.0
	DVT	x	x	x	.3	x	x	x
TCM	AIR	.9	1.1	.1	17.6	x	2.4	4.3
	DVT	.2	.1	x	1.5	x	x	x
OTH	AIR	x	x	x	x	x	x	x
	DVT	x	x	x	x	x	x	x
TOT	PRI 1	100.00	10.40	15.90	321.36	12.70	37.89	119.18
TOT	PRI 2	38.40	10.00	9.50	150.74	5.90	28.91	50.42
TOT	DVT	31.50	3.50	6.40	83.10	1.60	.10	30.70
TOT	DEST	169.90	23.90	31.80	555.20	20.20	66.90	200.30

ORGIN/DEST		NTD	SUU	NLC	NGZ	PWT	NUW	TCM
BOS	AIR	x	8.3	x	.9	3.9	x	3.2
	DVT	x	1.9	x	.1	2.2	x	.4
NCO	AIR	x	1.6	x	.3	.6	x	.7
	DVT	x	x	x	.1	x	x	.2
GON	AIR	x	3.0	x	1.4	.5	x	2.4
	DVT	.1	.2	x	.1	.1	x	2.0
DOV	AIR	x	19.8	x	1.8	1.7	1.8	7.0
	DVT	.3	1.7	x	.5	.6	.1	1.0
WRI	AIR	.1	2.1	.4	.1	.8	x	.4
	DVT	x	.5	x	.1	.3	.1	x
PHL	AIR	.5	9.1	.3	.7	2.4	.3	2.3
	DVT	.6	.4	.1	.3	.9	x	.2
IND	AIR	.5	7.5	.3	1.3	.5	2.6	1.9
	DVT	.3	1.0	.3	.4	x	.1	.1
NGU	AIR	9.1	86.5	3.1	5.8	13.4	4.7	23.8
	DVT	5.8	20.9	1.5	4.5	11.1	1.1	4.5
NKT	AIR	.9	17.5	.6	.2	x	.7	4.3
	DVT	.3	1.0	x	.1	x	.1	x
NHK	AIR	.4	6.1	.6	x	.2	.3	1.4
	DVT	1.7	1.1	.1	.1	.2	.3	.5
DCA	AIR	.4	7.6	x	.3	.2	x	1.6
	DVT	.1	.2	x	x	x	x	x
CHS	AIR	.8	20.8	x	2.4	3.6	.1	10.5
	DVT	.5	3.7	x	1.0	1.9	.1	2.9
NIP	AIR	2.1	24.1	7.5	.6	.7	9.8	2.6
	DVT	.9	3.9	.5	.2	.7	1.8	.9
NAP	AIR	.7	18.2	.9	.3	.5	1.5	3.0
	DVT	.1	1.0	.2	.2	x	.2	x
COF	AIR	.2	.6	x	.1	.6	x	.8
	DVT	x	x	x	x	.2	x	.2
NQX	AIR	.1	.4	x	x	.1	x	x
	DVT	.1	x	x	x	x	x	x
NZY	AIR	10.4	117.7	14.7	15.6	17.2	6.9	40.1
	DVT	2.7	20.3	.9	19.3	12.7	2.3	6.3
SBD	AIR	3.9	1.8	x	.4	.1	x	x
	DVT	x	.1	x	x	x	x	.1
LGB	AIR	1.6	11.9	1.5	3.9	1.1	1.1	5.8
	DVT	.1	.6	x	6.9	1.5	.1	1.1
NTD	AIR	x	16.3	3.4	.7	.3	.2	3.5
	DVT	x	2.7	.8	.6	.3	x	x
SUU	AIR	4.3	x	9.8	25.2	15.9	15.2	97.9
	DVT	.1	x	x	4.5	7.6	2.5	13.5
NLC	AIR	.5	7.9	x	x	x	.2	1.6
	DVT	x	x	x	x	x	x	x
NGZ	AIR	2.3	.6	x	x	14.3	2.9	31.8
	DVT	x	x	x	x	8.6	.2	2.1
PWT	AIR	.5	15.3	.1	2.7	x	17.7	6.1
	DVT	x	33.9	x	17.6	x	1.2	.2
NUW	AIR	.3	16.3	.3	1.0	.1	x	3.3
	DVT	x	3.8	x	.1	.8	x	x
TCM	AIR	1.4	49.6	.5	9.0	5.3	3.1	x
	DVT	.1	3.5	.1	6.0	.1	.2	x
CTH	AIR	x	x	x	x	x	x	x
	DVT	x	x	x	x	x	x	x
TOT PRI 1		22.40	307.44	28.70	40.40	52.70	40.58	172.34
TOT PRI 2		18.60	163.16	15.30	34.30	31.30	28.52	83.66
TOT DVT		13.80	102.40	4.50	62.70	49.80	10.40	36.20
TOT DEST		54.80	573.00	48.50	137.40	133.80	79.50	292.20

ORGIN/DEST		OTH	TOTAL PRI 1	TOTAL PRI 2	TOTAL DVT	TOTAL ORIGIN
BOS	AIR	x	51.10	22.00		
	DVT	x			9.4	82.5
NCO	AIR	x	9.54	6.46		
	DVT	x			1.5	17.5
GON	AIR	x	30.98	20.32		
	DVT	x			7.1	58.4
DOV	AIR	X	106.70	56.20		
	DVT	x			11.8	174.7
WRI	AIR	x	8.20	11.30		
	DVT	x			3.2	22.7
PHL	AIR	x	51.34	30.06		
	DVT	x			7.2	88.7
IND	AIR	x	28.85	26.65		
	DVT	x			8.9	64.3
NGU	AIR	.2	508.80	327.90		
	DVT	x			206.1	1042.8
NKT	AIR	x	85.24	53.36		
	DVT	x			17.1	155.7
NHK	AIR	x	48.03	20.77		
	DVT	x			13.0	81.8
DCA	AIR	x	41.61	11.79		
	DVT	x			3.5	56.9
CHS	AIR	.1	167.83	81.77		
	DVT	x			60.7	310.3
NIP	AIR	2.6	200.69	59.41		
	DVT	x			38.2	298.3
NPA	AIR	x	86.80	60.20		
	DVT	x			21.5	168.5
COF	AIR	.2	4.70	4.70		
	DVT	x			3.3	12.7
NQX	AIR	.1	10.81	5.49		
	DVT	x			4.5	20.8
NZY	AIR	x	310.80	144.80		
	DVT	x			115.2	570.8
SBD	AIR	x	32.68	21.72		
	DVT	x			1.8	56.2
LGB	AIR	x	57.07	23.13		
	DVT	x			20.2	100.4
NTD	AIR	x	24.40	28.20		
	DVT	x			20.6	73.2
SUU	AIR	x	381.85	141.95		
	DVT	x			80.6	604.4
NLC	AIR	x	21.70	4.70		
	DVT	x			3.7	30.1
NGZ	AIR	x	146.90	63.50		
	DVT	x			27.4	237.8
PWT	AIR	x	43.10	38.70		
	DVT	x			57.3	139.1
NUW	AIR	x	32.97	19.83		
	DVT	x			11.3	64.1
TCM	AIR	.4	65.25	63.05		
	DVT	x			15.9	144.2
OTH	AIR	x	1.90	x		
	DVT	x			x	1.9
TOTAL PRI 1		3.40	2559.84*	x	x	x
TOTAL PRI 2		.20	x	1347.96*	x	x
TOTAL DVT		x	x	x	771.0	x
TOTAL DEST		3.60	x	x	x	4678.8

*Numbers do not balance precisely due to rounding errors.

NOTE: All units are in tons (2000 lbs)

APPENDIX E

ORIGIN HIGH PRIORITY AIR CARGO DISTRIBUTION

ORGIN/DEST		BOS	NCO	GON	DOV	WRI	PHL	IND
BOS	PRI 1	x	.14	2.94	.49	x	.28	.21
	PRI 2	x	.06	1.26	.21	x	.12	.09
NCO	PRI 1	.18	x	.89	.48	x	.06	.06
	PRI 2	.12	x	.61	.32	x	.04	.04
GON	PRI 1	3.32	.24	x	1.09	x	.60	.18
	PRI 2	2.18	.16	x	.71	x	.40	.12
DOV	PRI 1	1.90	.26	2.10	x	.39	2.75	1.05
	PRI 2	1.00	.14	1.10	x	.21	1.45	.55
WRI	PRI 1	.21	x	x	.42	x	.63	x
	PRI 2	.29	x	x	.58	x	.87	x
PHL	PRI 1	1.94	.24	.97	2.89	.12	x	.24
	PRI 2	.66	.16	.43	3.41	.08	x	.06
IND	PRI 1	.52	x	.16	.68	.05	.26	x
	PRI 2	.48	x	.14	.62	.05	.24	x
NGU	PRI 1	14.59	4.74	21.04	39.89	7.72	14.96	2.80
	PRI 2	9.41	3.06	13.56	25.71	4.98	9.64	1.80
NKT	PRI 1	1.17	x	.68	2.95	.18	.43	.49
	PRI 2	.73	x	.42	1.85	.12	.27	.31
NHK	PRI 1	.91	x	.21	1.75	.35	.56	.28
	PRI 2	.39	x	.09	.75	.15	.24	.12
DCA	PRI 1	x	x	.47	.78	.39	.16	.39
	PRI 2	x	x	.13	.22	.11	.04	.11
CHS	PRI 1	13.72	2.29	10.22	5.45	.13	3.83	4.17
	PRI 2	6.68	1.11	4.98	2.65	.07	1.87	2.03
NIP	PRI 1	4.32	.23	.39	14.20	.46	2.93	1.77
	PRI 2	1.28	.07	.11	4.20	.14	.87	.53
NPA	PRI 1	.47	x	1.06	1.30	.59	.94	.18
	PRI 2	.33	x	.74	.90	.41	.66	.12
COF	PRI 1	.20	.05	.25	.20	x	x	.10
	PRI 2	.20	.05	.25	.20	x	x	.10
NQX	PRI 1	.07	x	.07	.07	x	.07	.07
	PRI 2	.03	x	.03	.03	x	.03	.03
NZY	PRI 1	2.32	1.36	2.93	6.55	.61	2.80	3.62
	PRI 2	1.08	.64	1.37	3.05	.29	1.30	1.68
SBD	PRI 1	x	x	x	x	x	x	x
	PRI 2	x	x	x	x	x	x	x
LGB	PRI 1	.64	.36	.28	.93	x	.64	.78
	PRI 2	.26	.14	.12	.37	x	.26	.32
NTD	PRI 1	x	.05	x	x	x	1.62	.14
	PRI 2	x	.05	x	x	x	1.88	.16
SUU	PRI 1	7.51	.80	4.74	10.93	1.17	4.81	3.28
	PRI 2	2.79	.30	1.76	4.07	.43	1.79	1.22
NLC	PRI 1	.33	x	x	x	.08	x	.16
	PRI 2	.07	x	x	x	.02	x	.04
NGZ	PRI 1	2.37	.42	1.26	1.89	.21	4.12	.28
	PRI 2	1.03	.18	.54	.81	.09	1.78	.12
PWT	PRI 1	.84	.21	1.42	.84	.05	.58	.26
	PRI 2	.76	.19	1.28	.76	.05	.52	.25
NUW	PRI 1	x	x	.06	1.00	x	.06	1.31
	PRI 2	x	x	.04	.60	x	.04	.79
TCM	PRI 1	.76	.61	1.32	.76	x	.61	.15
	PRI 2	.74	.59	1.28	.74	x	.59	.15
CTH	PRI 1	x	x	x	x	x	x	x
	PRI 2	x	x	x	x	x	x	x
TOT	PRI 1	58.29	12.00	53.46	95.54	12.50	43.70	21.97
TOT	PRI 2	30.51	6.90	30.24	52.76	7.20	24.90	10.73
TOT	DEST	88.80	18.90	83.70	148.30	19.70	68.60	32.70

ORGIN/DEST		NGU	NKT	NHK	DCA	CHS	KBY	NIP
BOS	PRI 1	11.46	1.33	.28	.07	17.41	.84	1.19
	PRI 2	4.94	.57	.12	.03	7.49	.36	.51
NCO	PRI 1	3.16	.12	x	.18	1.31	x	.06
	PRI 2	2.14	.08	x	.12	.89	x	.04
GON	PRI 1	12.44	.06	.06	.72	3.37	.54	1.75
	PRI 2	8.16	.04	.04	.48	2.46	.36	1.15
DOV	PRI 1	40.41	5.70	1.83	1.05	14.08	.39	4.59
	PRI 2	21.29	3.00	.97	.55	7.42	.21	2.41
WRI	PRI 1	2.52	.50	.34	.17	.04	x	.63
	PRI 2	3.48	.70	.46	.23	.06	x	.87
PHL	PRI 1	14.44	.69	.32	.69	4.82	.24	6.79
	PRI 2	8.26	.71	.18	.21	3.68	.36	2.11
IND	PRI 1	8.70	.47	.42	.26	3.64	.05	.57
	PRI 2	8.00	.43	.38	.24	3.36	.05	.53
NGU	PRI 1	x	41.23	15.08	17.70	85.80	5.53	54.06
	PRI 2	x	26.57	9.72	11.40	55.30	3.57	34.84
NKT	PRI 1	31.24	x	3.01	1.97	.80	x	4.43
	PRI 2	19.56	x	1.89	1.23	.5	x	2.77
NHK	PRI 1	22.83	5.24	x	x	1.82	x	3.07
	PRI 2	9.87	2.26	x	x	.78	x	1.33
DCA	PRI 1	8.26	6.78	x	x	13.95	.16	.16
	PRI 2	2.34	1.92	x	x	3.95	.04	.04
CHS	PRI 1	62.47	1.34	1.01	2.29	x	x	7.33
	PRI 2	30.43	.66	.49	1.11	x	x	3.57
NIP	PRI 1	54.48	8.10	4.17	.54	6.02	.23	x
	PRI 2	16.12	2.40	1.23	.16	1.78	.07	x
NPA	PRI 1	22.26	4.43	1.59	.35	5.08	x	18.13
	PRI 2	15.44	3.07	1.11	.25	3.52	x	12.57
COF	PRI 1	.60	.45	x	.10	.65	x	.05
	PRI 2	.60	.45	x	.10	.65	x	.05
NQX	PRI 1	1.33	.93	.07	x	.07	.07	5.30
	PRI 2	.67	.47	.03	x	.03	.03	2.70
NZY	PRI 1	41.96	8.87	1.77	3.00	12.28	.27	9.96
	PRI 2	19.54	4.13	.83	1.40	5.72	.13	4.64
SBD	PRI 1	.06	.12	.06	x	x	x	.12
	PRI 2	.04	.08	.04	x	x	x	.08
LGB	PRI 1	8.97	2.42	.85	.43	3.63	x	1.64
	PRI 2	3.63	.98	.35	.17	1.47	x	.66
NTD	PRI 1	4.04	.32	.14	.09	.19	.05	.42
	PRI 2	4.66	.38	.16	.11	.21	.05	.48
SUU	PRI 1	50.59	10.06	3.86	4.01	18.52	.44	21.07
	PRI 2	18.81	3.74	1.44	1.49	6.88	.16	7.83
NLC	PRI 1	1.56	.33	.41	.08	.16	x	4.60
	PRI 2	.34	.07	.09	.02	.04	x	1.00
NGZ	PRI 1	13.27	.91	.63	.63	5.73	.14	2.02
	PRI 2	5.73	.39	.27	.27	2.47	.06	.88
FWT	PRI 1	2.90	x	.05	.37	2.11	x	.16
	PRI 2	2.60	x	.05	.33	1.89	x	.14
NUW	PRI 1	3.68	.44	.31	.06	x	x	7.99
	PRI 2	2.22	.26	.19	.04	x	x	4.81
TCM	PRI 1	3.97	.05	.05	.51	6.82	.10	.86
	PRI 2	3.83	.05	.05	.49	6.58	.10	.84
CTH	PRI 1	x	x	x	x	x	x	1.90
	PRI 2	x	x	x	x	x	x	x
TOT	PRI 1	427.60	100.89	36.31	35.27	208.67	9.05	158.85
TOT	PRI 2	212.70	53.41	20.09	20.43	117.13	5.55	86.85
TOT	DEST	640.30	154.30	56.40	55.70	325.80	14.60	245.70

ORGIN/DEST		NPA	CCF	NQX	NZY	NYL	SBD	IGB
BOS	PRI 1	.28	.14	x	1.54	x	x	1.12
	PRI 2	.12	.06	x	.66	x	x	.48
NCO	PRI 1	.24	.06	x	.66	x	x	.18
	PRI 2	.16	.04	x	.44	x	x	.12
GON	PRI 1	.12	.54	x	.97	x	x	.18
	PRI 2	.08	.36	x	.63	x	x	.12
DOV	PRI 1	1.38	.13	.13	4.91	x	.66	1.97
	PRI 2	.72	.07	.07	2.59	x	.34	1.03
WRI	PRI 1	.42	x	x	.55	x	.08	.14
	PRI 2	.58	x	x	.75	x	.12	.06
PHL	PRI 1	.72	x	.08	3.97	x	.16	2.31
	PRI 2	.48	x	.02	2.23	x	.14	1.09
IND	PRI 1	.21	.21	.10	3.59	x	.21	1.15
	PRI 2	.19	.19	.10	3.31	x	.19	1.05
NGU	PRI 1	15.51	1.46	4.38	15.75	x	4.01	17.39
	PRI 2	9.99	.94	2.82	33.35	x	2.59	11.21
NKT	PRI 1	3.20	.18	.68	11.38	x	2.40	5.17
	PRI 2	2.00	.12	.42	7.12	x	1.50	3.23
NHK	PRI 1	1.26	x	.21	2.37	x	x	.91
	PRI 2	.54	x	.09	1.03	x	x	.39
DCA	PRI 1	.47	x	.16	.86	x	.55	.23
	PRI 2	.13	x	.04	.24	x	.15	.07
CHS	PRI 1	6.46	6.12	.67	8.34	x	.61	5.65
	PRI 2	3.14	2.98	.33	4.06	x	.29	2.75
NIP	PRI 1	42.90	x	6.79	9.88	x	.23	4.48
	PRI 2	12.70	x	2.01	2.92	x	.07	1.32
NPA	PRI 1	x	.89	1.59	8.21	x	1.48	3.42
	PRI 2	x	.61	1.11	5.69	x	1.02	2.38
COF	PRI 1	.20	x	.05	.10	x	x	.45
	PRI 2	.20	x	.05	.10	x	x	.45
NQX	PRI 1	1.19	.60	x	.20	x	x	.27
	PRI 2	.61	.30	x	.10	x	x	.13
NZY	PRI 1	9.69	1.23	.68	x	12.69	21.90	14.46
	PRI 2	4.51	.57	.32	x	5.91	10.20	6.74
SBD	PRI 1	.06	x	x	26.67	x	x	1.86
	PRI 2	.04	x	x	17.73	x	x	1.24
IGB	PRI 1	2.42	.07	.07	11.95	x	1.85	x
	PRI 2	.98	.03	.03	4.85	x	.75	x
NTD	PRI 1	.23	x	.09	3.29	x	2.09	.32
	PRI 2	.27	x	.11	3.81	x	2.41	.38
SUU	PRI 1	7.58	.44	1.17	89.59	x	3.50	15.09
	PRI 2	2.82	.16	.43	33.31	x	1.30	5.61
NLC	PRI 1	.25	.16	x	4.77	x	x	.41
	PRI 2	.05	.04	x	1.03	x	x	.09
NGZ	PRI 1	.98	.28	.21	44.20	x	2.37	28.77
	PRI 2	.42	.12	.09	19.10	x	1.03	12.43
PWT	PRI 1	.11	.11	.11	7.43	x	x	3.21
	PRI 2	.09	.09	.09	6.67	x	x	2.89
NUW	PRI 1	.50	x	x	3.50	x	.12	.62
	PRI 2	.30	x	x	2.10	x	.08	.38
TCM	PRI 1	.46	.56	.05	8.95	x	1.22	2.19
	PRI 2	.44	.54	.05	8.65	x	1.18	2.11
CTH	PRI 1	x	x	x	x	x	x	x
	PRI 2	x	x	x	x	x	x	x
TOT	PRI 1	96.84	13.18	17.22	309.63	12.69	43.44	111.85
TOT	PRI 2	41.56	7.22	8.18	162.47	5.91	23.36	57.75
TOT	DEST	138.40	20.40	25.40	472.10	18.60	66.80	179.60

ORGIN/DEST		NTD	SUU	NLC	NGZ	PWT	NUW	TCM
BOS	PRI 1	x	5.80	x	.63	2.73	x	2.24
	PRI 2	x	2.50	x	.27	1.17	x	.96
NCO	PRI 1	x	.95	x	.18	.36	x	.42
	PRI 2	x	.65	x	.12	.24	x	.28
GON	PRI 1	x	1.81	x	.85	.30	x	1.45
	PRI 2	x	1.19	x	.55	.20	x	.95
DOV	PRI 1	x	12.97	x	1.18	1.11	1.18	4.59
	PRI 2	x	6.83	x	.62	.59	.62	2.41
WRI	PRI 1	.04	.88	.17	.04	.34	x	.17
	PRI 2	.06	1.22	.23	.06	.46	x	.23
PHL	PRI 1	.24	5.75	.12	.48	1.54	.12	1.46
	PRI 2	.26	3.35	.18	.22	.86	.18	.84
IND	PRI 1	.26	3.91	.16	.68	.26	1.35	.99
	PRI 2	.24	3.59	.14	.62	.24	1.25	.91
NGU	PRI 1	5.53	52.60	1.89	3.53	8.15	2.86	14.47
	PRI 2	3.57	33.90	1.21	2.27	5.25	1.84	9.33
NKT	PRI 1	.55	10.76	.37	.12	x	.43	2.64
	PRI 2	.35	6.74	.23	.08	x	.27	1.66
NHK	PRI 1	.28	4.26	.42	x	.14	.21	.98
	PRI 2	.12	1.84	.18	x	.06	.09	.42
DCA	PRI 1	.31	5.92	x	.23	.16	x	1.25
	PRI 2	.09	1.68	x	.07	.04	x	.35
CHS	PRI 1	.54	13.99	x	1.61	2.42	.07	7.06
	PRI 2	.26	6.81	x	.79	1.18	.03	3.44
NIP	PRI 1	1.62	18.60	5.79	.46	.54	7.56	2.01
	PRI 2	.48	5.50	1.71	.14	.16	2.24	.59
NAP	PRI 1	.41	10.75	.53	.18	.30	.89	1.77
	PRI 2	.29	7.45	.37	.12	.20	.61	1.23
COF	PRI 1	.10	.30	x	.05	.30	x	.40
	PRI 2	.10	.30	x	.05	.30	x	.40
NQX	PRI 1	.07	.27	x	x	.07	x	x
	PRI 2	.03	.13	x	x	.03	x	x
NZY	PRI 1	7.09	80.29	10.03	10.64	11.73	4.71	27.36
	PRI 2	3.31	37.41	4.67	4.96	5.47	2.19	12.74
SBD	PRI 1	2.34	1.08	x	.24	.06	x	x
	PRI 2	1.56	.72	x	.16	.04	x	x
LGB	PRI 1	1.14	8.47	1.07	2.78	.78	.78	4.13
	PRI 2	.46	3.43	.43	1.12	.32	.32	1.67
NTD	PRI 1	x	7.56	1.58	.32	.14	.09	1.62
	PRI 2	x	8.74	1.82	.38	.16	.11	1.88
SUU	PRI 1	3.13	x	7.14	18.37	11.59	11.08	71.37
	PRI 2	1.17	x	2.66	6.83	4.31	4.12	26.53
NLC	PRI 1	.41	6.49	x	x	x	.16	1.32
	PRI 2	.09	1.41	x	x	x	.04	.28
NGZ	PRI 1	1.61	.42	x	x	9.98	2.02	22.20
	PRI 2	.69	.18	x	x	4.32	.88	9.60
PWT	PRI 1	.26	8.06	.05	1.42	x	9.33	3.21
	PRI 2	.24	7.24	.05	1.28	x	8.37	2.89
NUW	PRI 1	.19	10.18	.19	.62	.06	x	2.06
	PRI 2	.11	6.12	.11	.38	.04	x	1.24
TCM	PRI 1	.71	25.23	.25	4.58	2.70	1.58	x
	PRI 2	.69	24.37	.25	4.42	2.60	1.52	x
CTH	PRI 1	x	x	x	x	x	x	x
	PRI 2	x	x	x	x	x	x	x
TOT	PRI 1	26.83	297.30	29.76	49.19	55.76	44.42	175.17
TOT	PRI 2	14.17	173.30	14.24	25.51	28.24	24.68	80.83
TOT	DEST	41.00	470.60	44.00	74.70	84.00	69.10	256.00

ORGIN/DEST		OTH	TOTAL PRI 1	TOTAL PRI 2	TOTAL ORIGIN
EOS	PRI 1	x	51.12		
	PRI 2	x		21.98	73.10
NCO	PRI 1	x	9.55		
	PRI 2	x		6.45	16.00
GON	PRI 1	x	30.96		
	PRI 2	x		20.34	51.30
DOV	PRI 1	x	106.71		
	PRI 2	x		56.19	162.90
WRI	PRI 1	x	8.19		
	PRI 2	x		11.31	19.50
PHL	PRI 1	x	51.34		
	PRI 2	x		30.16	81.50
IND	PRI 1	x	28.86		
	PRI 2	x		26.54	55.40
NGU	PRI 1	.12	508.79		
	PRI 2	.08		327.91	836.70
NKT	PRI 1	x	85.23		
	PRI 2	x		53.37	136.60
NHK	PRI 1	x	48.06		
	PRI 2	x		20.74	68.80
DCA	PRI 1	x	41.64		
	PRI 2	x		11.76	53.40
CHS	PRI 1	.07	167.86		
	PRI 2	.03		81.74	259.60
NIP	PRI 1	2.01	200.71		
	PRI 2	.59		59.39	260.10
NPA	PRI 1	x	86.80		
	PRI 2	x		60.20	147.00
COF	PRI 1	.10	4.70		
	PRI 2	.10		4.70	9.40
NQX	PRI 1	.07	10.86		
	PRI 2	.03		5.44	16.30
NZY	PRI 1	x	310.80		
	PRI 2	x		144.80	455.60
SBD	PRI 1	x	32.67		
	PRI 2	x		21.73	54.40
LGB	PRI 1	x	57.08		
	PRI 2	x		23.12	80.20
NTD	PRI 1	x	24.39		
	PRI 2	x		28.10	52.60
SUU	PRI 1	x	381.84		
	PRI 2	x		141.96	523.80
NLC	PRI 1	x	21.68		
	PRI 2	x		4.72	26.40
NGZ	PRI 1	x	146.92		
	PRI 2	x		63.48	210.40
PWT	PRI 1	x	43.09		
	PRI 2	x		38.71	81.80
NUW	PRI 1	x	32.95		
	PRI 2	x		19.85	52.80
TCM	PRI 1	.20	65.25		
	PRI 2	.20		63.05	128.30
CTH	PRI 1	x	1.90		
	PRI 2	x		x	1.90
TOT	PRI 1	2.57	2559.95*	x	x
TOT	PRI 2	1.03	x	1347.85*	x
TOT	DEST	3.60	x	x	3907.80

* Numbers do not agree precisely with appendix D due to rounding errors.

NOTE: All units are in tons (2000 lbs).

APPENDIX F

TOTAL CARGO DISTRIBUTION

ORIGIN/DEST		BOS	NCO	GON	DOV	WRI	PHL	IND
BOS	PRI 1	x	.14	3.84	.49	x	.28	.49
	PRI 2	x	.06	1.66	.21	x	.12	.21
NCO	PRI 1	.18	x	.89	.48	x	.06	.12
	PRI 2	.12	x	.61	.32	x	.04	.08
GON	PRI 1	4.29	.30	x	1.09	x	.60	.42
	PRI 2	2.81	.20	x	.71	x	.40	.28
DOV	PRI 1	1.90	.26	2.10	x	.39	2.75	1.31
	PRI 2	1.00	.14	1.10	x	.21	1.45	.69
WRI	PRI 1	.21	x	x	.42	x	.63	x
	PRI 2	.29	x	x	.58	x	.87	x
PHL	PRI 1	1.94	.24	.97	2.89	.12	x	.32
	PRI 2	.66	.16	.43	3.41	.08	x	.08
IND	PRI 1	.68	x	.16	.73	.05	.31	x
	PRI 2	.62	x	.14	.67	.05	.29	x
NGU	PRI 1	14.59	4.74	21.04	40.26	7.72	14.96	4.80
	PRI 2	9.41	3.06	13.56	25.94	4.98	9.64	3.10
NKT	PRI 1	1.17	x	.68	2.95	.18	.43	.68
	PRI 2	.73	x	.42	1.85	.12	.27	.42
NHK	PRI 1	.91	x	.21	1.75	.35	.56	.42
	PRI 2	.39	x	.09	.75	.15	.24	.18
DCA	PRI 1	x	x	.47	1.01	.39	.16	.39
	PRI 2	x	x	.13	.29	.11	.04	.11
CHS	PRI 1	17.95	2.62	11.77	6.93	.27	4.44	5.38
	PRI 2	8.75	1.28	5.73	3.37	.13	2.16	2.62
NIP	PRI 1	5.09	.23	.46	15.20	.69	4.17	2.01
	PRI 2	1.51	.07	.14	4.50	.21	1.23	.59
NPA	PRI 1	.83	.12	1.30	1.36	.65	1.24	.30
	PRI 2	.57	.08	.90	.94	.45	.86	.20
COF	PRI 1	.20	.05	.25	.20	x	x	.10
	PRI 2	.20	.05	.25	.20	x	x	.10
NQX	PRI 1	.07	x	.07	.07	.07	.07	.07
	PRI 2	.03	x	.03	.03	.03	.03	.03
NZY	PRI 1	3.07	1.50	3.48	8.12	.68	3.21	6.62
	PRI 2	1.43	.70	1.62	3.78	.32	1.49	3.08
SBD	PRI 1	.54	x	x	x	x	x	.18
	PRI 2	.36	x	x	x	x	x	.12
LGB	PRI 1	.71	.43	.50	1.00	x	.78	1.00
	PRI 2	.29	.17	.20	.40	x	.32	.40
NTD	PRI 1	x	.09	x	x	x	2.51	.28
	PRI 2	x	.11	x	x	x	2.89	.32
SUU	PRI 1	10.28	.87	5.10	14.36	1.31	5.76	4.96
	PRI 2	3.82	.33	1.90	5.34	.49	2.14	1.84
NLC	PRI 1	.58	x	x	x	.08	x	.16
	PRI 2	.12	x	x	x	.02	x	.04
NGZ	PRI 1	2.58	.42	1.61	2.51	.21	5.52	.84
	PRI 2	1.12	.18	.69	1.09	.09	2.38	.36
PWT	PRI 1	1.05	.47	1.79	1.05	.05	.79	.53
	PRI 2	.95	.43	1.61	.95	.05	.71	.47
NUW	PRI 1	x	x	.06	1.19	.12	.06	1.62
	PRI 2	x	x	.04	.71	.08	.04	.98
TCM	PRI 1	.86	.66	1.37	1.02	x	.81	.15
	PRI 2	.84	.64	1.33	.98	x	.79	.15
CTH	PRI 1	x	x	x	x	x	x	x
	PRI 2	x	x	x	x	x	x	x
TOT	PRI 1	69.68	13.14	58.12	105.08	13.33	50.10	33.15
TOT	PRI 2	36.02	7.66	32.58	57.02	7.57	28.40	16.45
TOT	DEST	105.70	20.80	90.70	162.10	20.90	78.50	49.60

ORGIN/DEST		NGU	NKT	NHK	DCA	CHS	KBY	NIP
BOS	PRI 1	11.53	1.33	.28	.07	18.52	.84	1.40
	PRI 2	4.97	.57	.12	.03	7.98	.36	.60
NCO	PRI 1	3.16	.12	x	.18	1.61	x	.06
	PRI 2	2.14	.08	x	.12	1.09	x	.04
GON	PRI 1	12.44	.06	.06	.72	4.47	.54	1.99
	PRI 2	8.16	.04	.04	.48	2.93	.36	1.31
DOV	PRI 1	40.41	5.70	1.83	1.05	15.98	.39	5.50
	PRI 2	21.29	3.00	.97	.55	8.42	.21	2.90
WRI	PRI 1	2.52	.50	.38	.17	.08	x	.76
	PRI 2	3.48	.70	.52	.23	.12	x	1.04
PHL	PRI 1	14.44	.69	.32	.69	5.39	.24	8.20
	PRI 2	8.26	.71	.18	.21	3.81	.36	2.50
IND	PRI 1	9.69	.78	.47	.26	3.91	.05	.68
	PRI 2	8.91	.72	.43	.24	3.59	.05	.62
NGU	PRI 1	x	41.53	15.08	17.70	106.05	5.78	83.49
	PRI 2	x	26.77	9.72	11.40	68.35	3.72	53.81
NKT	PRI 1	31.43	x	3.01	1.97	.86	x	5.97
	PRI 2	19.67	x	1.89	1.23	.54	x	3.73
NHK	PRI 1	22.83	5.24	x	x	2.30	.07	4.40
	PRI 2	9.87	2.26	x	x	1.00	.03	1.90
DCA	PRI 1	9.82	6.78	x	x	14.18	.16	.16
	PRI 2	2.78	1.92	x	x	4.02	.04	.04
CHS	PRI 1	78.27	1.61	1.41	2.69	x	x	10.76
	PRI 2	38.13	.79	.69	1.31	x	x	5.24
NIP	PRI 1	63.97	9.41	5.09	.85	6.02	.23	x
	PRI 2	18.93	2.79	1.51	.25	1.78	.07	x
NPA	PRI 1	25.57	7.09	2.18	.53	5.08	x	18.13
	PRI 2	17.73	4.91	1.52	.37	3.52	x	12.57
COF	PRI 1	.65	.45	x	.10	.65	x	1.40
	PRI 2	.65	.45	x	.10	.65	x	1.40
NQX	PRI 1	2.79	1.26	.13	x	.07	.07	6.30
	PRI 2	1.41	.64	.07	x	.03	.03	3.20
NZY	PRI 1	53.48	12.35	2.11	3.82	14.26	.27	13.17
	PRI 2	24.92	5.75	.99	1.78	6.64	.13	6.13
SBD	PRI 1	.12	.12	.06	x	x	x	.12
	PRI 2	.08	.08	.04	x	x	x	.08
LGB	PRI 1	11.17	3.27	.85	.57	4.06	.07	1.85
	PRI 2	4.53	1.33	.35	.23	1.64	.03	.75
NTD	PRI 1	4.96	.32	.19	.09	.28	.05	.46
	PRI 2	5.74	.38	.21	.11	.32	.05	.54
SUU	PRI 1	67.72	11.96	4.52	5.18	19.61	.44	24.42
	PRI 2	25.18	4.44	1.68	1.92	7.29	.16	9.08
NLC	PRI 1	3.52	.33	.41	.08	.16	x	5.10
	PRI 2	.77	.07	.09	.02	.04	x	1.10
NGZ	PRI 1	17.11	1.40	.77	.84	7.47	.14	3.21
	PRI 2	7.39	.60	.33	.36	3.23	.06	1.39
PWT	PRI 1	3.37	x	.05	.47	2.16	x	.16
	PRI 2	3.03	x	.05	.43	1.94	x	.14
NUW	PRI 1	4.50	.75	.31	.06	x	x	10.18
	PRI 2	2.70	.45	.19	.04	x	x	6.12
TCM	PRI 1	4.93	.05	.10	.61	7.12	.10	.86
	PRI 2	4.77	.05	.10	.59	6.88	.10	.84
CTH	PRI 1	x	x	x	x	x	x	1.90
	PRI 2	x	x	x	x	x	x	x
TOT	PRI 1	500.41	113.10	39.61	38.70	240.29	9.44	210.63
TOT	PRI 2	245.49	59.50	21.69	22.00	135.81	5.76	117.07
TOT	DEST	745.90	172.60	61.30	60.70	376.10	15.20	327.70

ORGIN/DEST		NPA	COF	NQX	NZY	NYL	SBD	LGB
BOS	PRI 1	.28	.14	.07	1.82	x	x	1.54
	PRI 2	.12	.06	.03	.78	x	x	.66
NCO	PRI 1	.24	.12	x	.83	x	x	.30
	PRI 2	.16	.08	x	.57	x	x	.20
GON	PRI 1	.18	.60	x	1.15	x	x	.42
	PRI 2	.12	.40	x	.75	x	x	.28
DOV	PRI 1	1.77	.13	.26	5.76	x	.66	2.49
	PRI 2	.93	.07	.14	3.04	x	.34	1.31
WRI	PRI 1	.55	x	.04	.88	x	.08	.25
	PRI 2	.75	x	.06	1.22	x	.12	.35
PHL	PRI 1	.84	x	.08	4.69	x	.16	2.79
	PRI 2	.56	x	.02	2.71	x	.14	1.31
IND	PRI 1	.26	.21	.10	4.63	x	.21	1.56
	PRI 2	.24	.19	.10	4.27	x	.19	1.44
NGU	PRI 1	24.32	2.61	6.14	74.37	x	4.01	25.72
	PRI 2	15.68	1.69	3.96	47.93	x	2.59	16.58
NKT	PRI 1	4.49	.18	.92	16.30	x	2.46	6.27
	PRI 2	2.81	.12	.58	10.20	x	1.54	3.93
NHK	PRI 1	2.16	x	.42	4.68	x	x	1.75
	PRI 2	.94	x	.18	2.02	x	x	.75
DCA	PRI 1	.47	x	.39	1.01	x	.55	.31
	PRI 2	.13	x	.11	.29	x	.15	.09
CHS	PRI 1	6.52	6.12	.67	10.42	x	.61	7.67
	PRI 2	3.18	2.98	.33	5.08	x	.29	3.73
NIP	PRI 1	44.98	x	7.33	12.50	x	.23	6.25
	PRI 2	13.32	x	2.17	3.70	x	.07	1.85
NPA	PRI 1	x	.89	1.59	11.46	x	1.48	3.90
	PRI 2	x	.61	1.11	7.94	x	1.02	2.70
COF	PRI 1	.20	x	.05	.15	x	x	.45
	PRI 2	.20	x	.05	.15	x	x	.45
NQX	PRI 1	1.19	.60	x	.20	x	x	.27
	PRI 2	.61	.30	x	.10	x	x	.13
NZY	PRI 1	13.23	2.05	.96	x	13.78	21.90	15.49
	PRI 2	6.17	.95	.44	x	6.42	10.20	7.21
SBD	PRI 1	.18	x	x	26.73	x	x	1.86
	PRI 2	.12	x	x	17.77	x	x	1.24
LGB	PRI 1	2.99	.07	.07	13.73	x	1.85	x
	PRI 2	1.21	.03	.03	5.57	x	.75	x
NTD	PRI 1	.28	x	.09	7.89	x	2.09	1.02
	PRI 2	.32	x	.11	9.11	x	2.41	1.18
SUU	PRI 1	9.33	.44	1.75	90.61	x	3.50	15.24
	PRI 2	3.47	.16	.65	33.69	x	1.30	5.66
NLC	PRI 1	.33	.16	x	4.93	x	x	.49
	PRI 2	.07	.04	x	1.07	x	x	.11
NGZ	PRI 1	1.33	.35	.28	44.20	x	2.37	29.05
	PRI 2	.57	.15	.12	19.10	x	1.03	12.55
PWT	PRI 1	.11	.11	.16	7.48	x	x	3.27
	PRI 2	.09	.09	.14	6.72	x	x	2.93
NUW	PRI 1	.50	x	x	3.68	x	.12	.62
	PRI 2	.30	x	x	2.22	x	.08	.38
TCM	PRI 1	.56	.61	.05	9.71	x	1.22	2.19
	PRI 2	.54	.59	.05	9.39	x	1.18	2.11
CTH	PRI 1	x	x	x	x	x	x	x
	PRI 2	x	x	x	x	x	x	x
TOT	PRI 1	117.29	15.39	21.42	359.81	13.78	43.50	131.17
TOT	PRI 2	52.61	8.51	10.38	195.39	6.42	23.40	69.13
TOT	DEST	169.90	23.90	31.80	555.20	20.20	66.90	200.30

ORGIN/DEST		NTD	SUU	NLC	NGZ	PWT	NUW	TCM
EOS	PRI 1	x	7.13	x	.70	4.26	x	2.52
	PRI 2	x	3.07	x	.30	1.84	x	1.08
NCO	PRI 1	x	.95	x	.24	.36	x	.54
	PRI 2	x	.65	x	.16	.24	x	.36
GON	PRI 1	.06	1.93	x	.91	.36	x	2.66
	PRI 2	.04	1.27	x	.59	.24	x	1.74
DOV	PRI 1	.20	14.08	x	1.51	1.51	1.24	5.24
	PRI 2	.10	7.42	x	.79	.79	.66	2.76
WRI	PRI 1	.04	1.09	.17	.08	.46	.04	.17
	PRI 2	.06	1.51	.23	.12	.64	.06	.23
PHL	PRI 1	.53	6.03	.16	.68	2.14	.12	1.62
	PRI 2	.57	3.47	.24	.32	1.16	.18	.88
IND	PRI 1	.42	4.43	.31	.89	.26	1.41	1.04
	PRI 2	.38	4.07	.29	.81	.24	1.29	.96
NGU	PRI 1	9.06	65.31	2.80	6.26	14.90	3.53	17.21
	PRI 2	5.84	42.09	1.80	4.04	9.60	2.27	11.09
NKT	PRI 1	.74	11.38	.37	.18	x	.49	2.64
	PRI 2	.46	7.12	.23	.12	x	.31	1.66
NHK	PRI 1	1.47	5.03	.49	.07	.28	.42	1.33
	PRI 2	.63	2.17	.21	.03	.12	.18	.57
DCA	PRI 1	.39	6.08	x	.23	.16	x	1.25
	PRI 2	.11	1.72	x	.07	.04	x	.35
CHS	PRI 1	.87	16.47	x	2.29	3.70	.13	9.01
	PRI 2	.43	8.03	x	1.11	1.80	.07	4.39
NIP	PRI 1	2.31	21.60	6.17	.62	1.08	8.95	2.70
	PRI 2	.69	6.40	1.83	.18	.32	2.65	.80
NPA	PRI 1	.47	11.34	.65	.30	.30	1.00	1.77
	PRI 2	.33	7.86	.45	.20	.20	.70	1.23
COF	PRI 1	.10	.30	x	.05	.40	x	.50
	PRI 2	.10	.30	x	.05	.40	x	.50
NQX	PRI 1	.13	.27	x	x	.07	x	x
	PRI 2	.07	.13	x	x	.03	x	x
NZY	PRI 1	8.94	94.14	10.64	23.81	20.40	6.28	31.65
	PRI 2	4.16	43.86	4.96	11.09	9.50	2.92	14.75
SBD	PRI 1	2.34	1.14	x	.24	.06	x	.06
	PRI 2	1.56	.76	x	.16	.04	x	.04
LGB	PRI 1	1.21	8.90	1.07	7.69	1.85	.85	4.91
	PRI 2	.49	3.60	.43	3.11	.75	.35	1.99
NTD	PRI 1	x	8.81	1.95	.60	.28	.09	1.62
	PRI 2	x	10.19	2.25	.70	.32	.11	1.88
SUU	PRI 1	3.21	x	7.14	21.65	17.13	12.90	81.21
	PRI 2	1.19	x	2.66	8.05	6.37	4.80	30.19
NLC	PRI 1	.41	6.49	x	x	x	.16	1.32
	PRI 2	.09	1.41	x	x	x	.04	.28
NGZ	PRI 1	1.61	.42	x	x	15.99	2.16	23.67
	PRI 2	.69	.18	x	x	6.91	.94	10.23
PWT	PRI 1	.26	25.92	.05	10.70	x	9.96	3.32
	PRI 2	.24	23.28	.05	9.60	x	8.94	2.98
NUW	PRI 1	.19	12.55	.19	.69	.56	x	2.06
	PRI 2	.11	7.55	.11	.41	.34	x	1.24
TCM	PRI 1	.76	27.01	.31	7.63	2.75	1.68	x
	PRI 2	.74	26.09	.29	7.37	2.65	1.62	x
CTH	PRI 1	x	x	x	x	x	x	x
	PRI 2	x	x	x	x	x	x	x
TOT	PRI 1	35.72	358.80	32.47	88.02	89.26	51.41	200.02
TOT	PRI 2	19.08	214.20	16.03	49.38	44.54	28.09	92.18
TOT	DEST	54.80	573.00	48.50	137.40	133.80	79.50	292.20

ORGIN/DEST		OTH	TOTAL PRI 1	TOTAL PRI 2	TOTAL ORIGIN
BOS	PRI 1	x	57.67		
	PRI 2	x		24.83	82.50
NCO	PRI 1	x	10.44		
	PRI 2	x		7.06	17.50
GON	PRI 1	x	35.25		
	PRI 2	x		23.15	58.40
DOV	PRI 1	x	114.42		
	PRI 2	x		60.28	174.70
WRI	PRI 1	x	9.52		
	PRI 2	x		13.18	22.70
PHL	PRI 1	x	56.29		
	PRI 2	x		32.41	88.70
IND	PRI 1	x	33.50		
	PRI 2	x		30.80	64.30
NGU	PRI 1	.12	634.10		
	PRI 2	.08		408.70	1042.80
NKT	PRI 1	x	95.75		
	PRI 2	x		59.95	155.70
NHK	PRI 1	x	57.14		
	PRI 2	x		24.66	81.80
DCA	PRI 1	x	44.36		
	PRI 2	x		12.54	56.90
CHS	PRI 1	.07	208.65		
	PRI 2	.03		101.65	310.30
NIP	PRI 1	2.01	230.15		
	PRI 2	.59		68.15	298.30
NPA	PRI 1	x	99.53		
	PRI 2	x		68.97	168.50
COF	PRI 1	.10	6.35		
	PRI 2	.10		6.35	12.70
NQX	PRI 1	.07	13.84		
	PRI 2	.03		6.96	20.80
NZY	PRI 1	x	389.41		
	PRI 2	x		181.39	570.80
SBD	PRI 1	x	33.75		
	PRI 2	x		22.45	56.20
LGB	PRI 1	x	71.45		
	PRI 2	x		28.95	100.40
NTD	PRI 1	x	33.95		
	PRI 2	x		39.25	73.20
SUU	PRI 1	x	440.60		
	PRI 2	x		163.80	604.40
NLC	PRI 1	x	24.72		
	PRI 2	x		5.38	30.10
NGZ	PRI 1	x	166.06		
	PRI 2	x		71.74	237.80
PWT	PRI 1	x	73.28		
	PRI 2	x		65.82	139.10
NUW	PRI 1	x	40.01		
	PRI 2	x		24.09	64.10
TCM	PRI 1	.20	73.32		
	PRI 2	.20		70.88	144.20
CTH	PRI 1	x	1.90		
	PRI 2	x		x	1.90
TOT	PRI 1	2.57	3055.41	x	x
TOT	PRI 2	1.03	x	1623.39	x
TOT	DEST	3.60	x	x	4678.80

NOTE: All units are in tons (2000 lbs).

APPENDIX G

GOVERNMENT-FURNISHED SERVICES AND EQUIPMENT

1. Transient alert and ramp services which include:
    - a. Landing*
    - b. Follow-me vehicle
    - c. Towing
    - d. Parking*#
    - e. Chocking*#
    - f. Positioning, operating and depositioning of APU and air start units*#
    - g. Fire guard for engine starts*#
    - h. Positioning, operating and depositioning of compressor for airing or struts and tires*
    - i. Ramp sweeping*
    - j. Maintenance stands, refueling ladders and crew stairs
    - k. Fuel services*
    - l. Wash rack facilities
    - m. Into-plane service of propellers de-icing fluid, hydraulic fluid, ADI fluid and oxygen (gaseous or LOX) on a reimbursable basis for the materials
2. Terminal and traffic services which include:
    - a. Cargo receiving, processing, documentation and positioning for loading*#
    - b. Cargo manifesting*#
    - c. Cargo handling equipment*#
    - d. Portable water (includes equipment and into plane servicing)*#
    - e. Loading, tiedown, and unloading*#
    - f. Lavatory servicing carts (includes positioning, hook-up, operation, and depositioning)
    - g. Flightline transportation for crews*
3. Fire and crash rescue support*
4. Emergency medical services (on reimbursable basis)
5. Billeting and messing of the contractor's crews*

6. Space or facilities to support operations*
7. An automatic communication system at all terminals, the Navy Control office, and contractor's base of operations*
8. Load, tiedown, and unload ballast, upon request, when needed for test, training, or ferry flights*
9. Aircraft clearance facilities*

NOTE: All of the aforementioned items will be furnished at Air Force Installations.

* Only these items will be furnished at Naval Air Stations

# Only these items will be furnished at commercial airports

SOURCE: Part I, Section H, MAC Solicitation No. F11626-83-R-0031, Dated 12 July 1983

APPENDIX H

FLIGHT FREQUENCY, PATTERNS, TIMES AND STATUTE MILES

Flight 142 - Monday, Tuesday, Thursday, and Friday

Origin/Destination	ARRI - DEPART	MILES
Originate Travis ABF CA	ORIG - 1330	x
To NAS North Island CA	1520 - 1635	467
To NAS Pensacola FL	2210 - 2310	1766
To NAS Jacksonville FL	0030 - 0145	337
To Charleston AFB SC	0250 - 0350	207
To NAS Norfolk VA	0520 - 0635	350
To Dover AFB DE	0730 - TERM	158

Flight 141 - Tuesday, Wednesday, Friday, and Saturday

Origin/Destination	ARRI - DEPART	MILES
Originate Dover AFB DE	ORIG - 0945	x
To NAS Norfolk VA	1045 - 1200	158
To Charleston AFB SC	1345 - 1445	350
To NAS Jacksonville FL	1555 - 1710	207
To NAS Pensacola FL	1840 - 1940	337
To NAS North Island CA	0200 - 0315	1766
To Travis AFB CA	0515 - TERM	467

Flight 134 - Sunday, Wednesday, and Saturday

Origin/Destination	ARRI - DEPART	MILES
Originate Travis AFB CA	ORIG - 0801	x
To NAS North Island CA	0950 - 1105	467
To Indianapolis IN	1640 - 1740	1785
To NAS Norfolk VA	1950 - 2105	576
To Charleston AFB SC	2250 - 2350	350
To NAS Jacksonville FL	0059 - TERM	207

Flight 634 - Sunday, Wednesday, and Saturday

Origin/Destination	ARRI - DEPART	MILES
Originate NAS Jacksonville FL	ORIG - 0230	x
To Charleston AFB SC	0335 - 0455	207
To NAS Norfolk VA	0605 - 0720	350
To Dover AFB DE	0815 - TERM	158

Flight 133 - Sunday, Monday, and Tuesday

Origin/Destination	ARRI - DEPART	MILES
Originate Dover AFB DE	ORIG - 1015	X
To NAS Norfolk VA	1115 - 1230	158
To Indianapolis IN	1500 - 1600	576
To NAS North Island CA	2230 - 2345	1785
To Travis AFB CA	0145 - TERM	467

Flight 222 - Wednesday and Thursday

Origin/Destination	ARRI - DEPART	MILES
Originate Travis AFB CA	ORIG - 0945	x
To McChord AFB WA	1205 - 1335	614
To Travis AFB CA	1550 - TERM	614

Flight 232 - Sunday, Monday, and Thursday

Origin/Destination	ARRI - DEPART	MILES
Originate Travis AFB CA	ORIG - 0420	X
To McChord AFB WA	0640 - 0810	614
To Travis AFB CA	1025 - TERM	614

SOURCE: Part I, Section B, MAC Solicitation No. F11626-83-R-0031, Dated 12 July 1983

APPENDIX I

AVAILABLE AIR CARRIERS

CARRIER	B-272C/QC	DC-9-30C SERIES	L-188C	L-100
AIRBORNE EXPRESS INC.*..	x	6-32	x	x
AIR ONE INC.............	x	5-30	x	x
ALASKA INTERNATIONAL AIR INC.*..............	x	x	x	5-30
BRANIFF INTERNATIONAL...	4-QC	x	x	x
EASTERN.................	x	58-30	x	x
EVERGREEN INTERNATIONAL.	x	2-32	6	x
FEDERAL EXPRESS*........	15-QC	x	x	x
MIDAY...................	x	4-31	x	x
OZARK AIRLINES..........	x	33-30 2-34	x	x
PAN AMERICAN............	2-QC	x	x	x
REEVES ALEUTIAN AIRWAYS.	x	x	3	x
SOUTHERN AIR TRANSPORT*#	x	x	x	2-20 1-30
TEXAS INTERNATIONAL.....	x	18-30	x	x
TRANSAMERCIA*...........	x	x	8	12-30
TWA.....................	35-QC	x	x	x
US AIR..................	x	57-30	x	x
ZANTOP INTERNATIONAL*...	x	x	25	x

* All cargo carriers

# is in process of leasing two L-100-30's from a foreign country

SOURCE: World Aviation Directory, Summer 1982 edition

APPENDIX J

EMERY AIR FREIGHT RATE SCALES

ORGIN/DEST	BOS	NCO	GON	DOV	WRI	PHL	IND
BOS*	x	651	651	651	651	651	652
NCO+ PVD*	651	x	651	651	651	651	652
GON+ BDL*	651	651	x	651	651	651	652
DOV# PHL*	651	651	651	x	651	x	651
WRI* TRE*	651	651	651	651	x	651	651
PHL*	651	651	651	x	651	x	651
IND*	653	653	653	651	651	651	x
NGU*	651	652	652	651	651	651	652
NKT# RDU*	651	652	652	651	651	651	652
NHK# DCA*	651	651	651	651	651	651	652
DCA*	651	651	651	651	651	651	652
CHS+	653	653	653	653	653	653	653
KBY+ JAX*	653	653	653	653	653	653	653
NIP* JAX*	653	653	653	653	653	653	653
NPA+	655	655	655	655	655	655	653
COF+ MCO*	653	653	653	653	653	653	653
NQX# MIA*	654	654	654	653	653	653	653
NZY*	654	654	654	654	654	654	654
SBD+ LAX*	654	654	654	654	654	654	654
LGB* LAX*	654	654	654	654	654	654	654
NTD* SBA*	655	655	655	655	655	655	655
SUU# SFO*	654	654	654	654	654	654	654
NLC¦ FAT*	655	655	655	655	655	655	655
NGZ* SFC*	654	654	654	654	654	654	654
PWT# SEA*	654	654	654	654	654	654	654
NUW# SEA*	654	654	654	654	654	654	654
TCM+ SEA*	654	654	654	654	654	654	654

ORGIN/DEST	NGU	NKT	NHK	DCA	CHS	KBY	NIP
BOS*	651	651	651	651	653	653	653
NCO+ PVD*	652	652	651	651	653	653	653
GON+ BDL*	652	651	651	651	653	653	653
DOV# PHL*	651	651	651	651	652	653	653
WRI* TRE*	651	651	651	651	653	653	653
PHL*	651	651	651	651	652	653	653
IND*	652	652	652	652	653	653	653
NGU*	x	651	651	651	653	653	653
NKT* RDU*	651	x	651	651	653	653	653
NHK# DCA*	651	651	x	x	653	653	653
DCA*	651	651	x	x	653	653	653
CHS+	653	653	653	653	x	653	653
KBY+ JAX*	653	653	653	653	653	x	x
NIP* JAX*	653	653	653	653	653	x	x
NPA+	655	653	655	655	653	653	653
COF+ MCO*	652	652	653	653	653	652	652
NQX# MIA*	653	653	653	653	653	652	652
NZY*	654	654	654	654	655	655	655
SBD+ LAX*	654	654	654	654	654	654	654
LGB* LAX*	654	654	654	654	654	654	654
NTD* SBA*	655	655	655	655	655	655	655
SUU# SFO*	654	654	654	654	654	654	654
NLC| FAT	655	655	655	655	655	655	655
NGZ* SFO*	654	654	654	654	654	654	654
PWT# SEA*	654	654	654	654	655	655	655
NUW# SEA*	654	654	654	654	655	655	655
TCM+ SEA*	654	654	654	654	655	655	655

ORGIN/DEST	NPA	CCF	NQX	NZY	NYL	SBD	LGB
BOS*	655	653	653	654	654	654	654
NCO+ PVD*	655	653	654	654	654	654	654
GON+ BDL*	655	653	653	655	654	655	655
DOV# PHL*	655	652	652	654	654	654	654
WRI* TRE*	655	652	651	654	654	654	654
PHL*	655	652	652	654	654	654	654
IND*	653	653	653	654	654	654	654
NGU*	655	652	653	654	654	654	654
NKT* RDU*	653	652	653	654	654	654	654
NHK# DCA*	655	653	653	654	654	654	654
DCA*	655	653	653	654	654	654	654
CHS+	653	653	653	655	655	655	655
KBY+ JAX*	653	652	652	655	655	655	655
NIP* JAX*	653	652	652	655	655	655	655
NPA+	x	653	653	656	656	656	656
COF+ MCO*	653	x	651	654	654	654	654
NQX# MIA*	653	651	x	654	654	654	654
NZY*	656	654	654	x	651	651	651
SBD+ LAX*	656	654	654	651	651	x	x
LGB* LAX*	656	654	654	651	651	x	x
NTD* SBA*	656	655	655	652	652	651	651
SUU# SFO*	655	654	656	651	651	651	651
NLC# FAT*	656	655	655	651	652	651	651
NGZ* SFO*	655	654	656	651	651	651	651
FWT# SEA*	656	654	654	653	654	653	653
NUW# SEA*	656	654	654	653	654	653	653
TCM+ SEA*	656	654	654	653	654	653	653

ORGIN/DEST	NTD	SUU	NLC	NGZ	PWT	NUW	TCM
BOS*	655	654	656	654	654	654	654
NCO+ PVD*	655	654	655	654	654	654	654
GON+ BDL*	656	655	655	655	654	654	654
DOV# PHL*	655	654	656	654	654	654	654
WRI* TRE*	655	654	655	654	654	654	654
PHL*	655	654	656	654	654	654	654
IND*	655	654	655	654	654	654	654
NGU*	655	654	655	654	654	654	654
NKT* RDU*	655	654	655	654	654	654	654
NHK# DCA*	655	654	655	654	654	654	654
DCA*	655	654	655	654	654	654	654
CHS+	656	655	655	655	655	655	655
KBY+ JAX*	656	655	655	655	655	655	655
NIP* JAX*	656	655	655	655	655	655	655
NPA+	656	656	656	656	656	656	656
COF+ MCO*	655	654	655	654	654	654	654
NQX# MIA*	655	654	655	654	654	654	654
NZY*	652	651	652	651	653	653	653
SBD+ LAX*	651	651	651	651	653	653	653
LGB* LAX*	651	651	651	651	653	653	653
NTD* SEA*	x	652	652	652	654	654	654
SUU# SFO*	652	x	651	x	651	651	651
NLC| FAT*	652	651	x	651	654	654	654
NGZ* SFO*	652	x	651	x	651	651	651
PWT# SEA*	654	652	654	652	x	x	x
NUW# SEA*	654	652	654	652	x	x	x
TCM+ SEA*	654	652	654	652	x	x	x

* Delivery the next business morning.

+ Delivery the next business afternoon.

| Delivery the second business day.

# Shipments destined to these points will be delivered the next business day or later by connecting surface transportation.

SOURCE: Emery Worldwide, Service and Rate Guide, 1983

APPENDIX K

EMERY DOOR-TO-DOOR RATES

LBS	00	10	20	30	40	50	60	70	80	90
00	x	30	39	47	55	62	66	70	86	100
01	20	32	40	48	55	62	67	74	88	102
02	22	33	41	49	56	63	67	75	89	103
03	23	34	42	50	57	63	67	76	90	104
04	24	34	43	50	58	64	68	78	92	106
05	25	35	43	51	59	64	68	79	93	107
06	26	36	44	52	60	64	69	81	95	109
07	27	37	45	53	60	65	69	82	96	110
08	28	38	46	53	61	65	69	83	97	111
09	29	39	46	54	62	66	70	85	99	113

SHIPMENT RATES FOR OVER 99 POUNDS

LBS/SCALE	651	652	653	654	655	656
100	92	106	121	139	155	187
200	78	91	105	121	135	166
300	76	88	102	118	132	161
500	73	86	99	115	128	157
1000	67	77	89	103	115	140
2000	64	75	86	100	112	136
5000	62	73	84	97	108	133

SOURCE: Emery Worldwide, Service and Rate Guide
U.S./CANADA, Effective June 6, 1983

NOTE: Unless indicated otherwise all units are dollars.

APPENDIX L

O-D PAIRS LAND-HAUL DISTANCES

ORGIN/DEST	BOS	NCO	GON	DOV	WRI	PHL	IND
BOS	x	69	102	379	282	307	932
NCO	69	x	59	347	250	275	900
GON	102	59	x	292	195	202	845
DOV	379	347	292	x	111	84	679
WRI	282	250	195	111	x	37	678
PHL	307	275	220	84	37	x	655
IND	932	900	845	679	678	655	x
NGU	559	527	472	194	284	274	730
NKT	726	694	639	365	455	441	755
NHK	475	443	338	135	207	180	650
DCA	437	405	350	100	169	142	598
CHS	948	916	861	611	680	653	727
KBY	1133	1097	1046	795	865	838	852
NIP	1180	1148	1093	846	912	885	862
NPA	1399	1367	1312	1066	1131	1104	755
COF	1333	1301	1246	999	1069	1038	1015
NQX	1675	1642	1587	1430	1406	1379	1342
NZY	1674	3006	2951	2764	2784	2761	2106
SBD	2967	2935	2880	2704	2713	2690	2035
LGB	3032	3000	2945	2769	2778	2755	2100
NTD	3075	3043	2988	2812	2821	2798	2143
SUU	3083	3051	3002	2867	2866	2843	2236
NLC	3119	3092	3037	2888	2897	2874	2219
NGZ	3115	3088	3033	2898	2897	2874	2267
PWT	2983	2993	2938	2809	2808	2785	2215
NUW	3030	3039	2984	2855	2854	2831	2261
ICM	2985	2994	2938	2810	2809	2786	2216

ORGIN/DEST	NGU	NKT	NHK	DCA	CHS	KBY	NIP
BOS	559	726	475	437	948	1133	1180
NCO	527	694	443	405	916	1097	1148
GON	472	639	338	350	861	1041	1093
DOV	194	365	135	100	611	795	846
WRI	284	455	207	169	680	865	912
PHL	274	441	180	142	653	838	885
IND	730	755	650	598	727	852	862
NGU	x	172	185	186	418	609	654
NKT	172	x	345	340	282	448	540
NHK	185	345	x	51	520	701	752
DCA	186	340	51	x	515	699	747
CHS	418	282	520	515	x	221	278
KBY	609	448	701	699	221	x	51
NIP	654	540	752	747	278	51	x
NPA	920	828	993	973	566	415	384
COF	817	693	905	900	431	207	166
NQX	1148	1034	1246	1241	772	527	507
NZY	2684	2652	2707	2671	2434	2351	2356
SBD	2624	2592	2647	2611	2408	2331	2338
LGB	2679	2657	2712	2676	2473	2396	2403
NTD	2732	2700	2755	2719	2516	2439	2446
SUU	2931	2969	2838	2786	2785	2738	2771
NLC	2798	2776	2831	2795	2592	2556	2578
NGZ	2962	2948	2869	2871	2764	2728	2750
PWT	2906	2964	2780	2782	2930	2982	2981
NUW	2949	3010	2826	2774	2976	3020	3027
TCM	2904	2965	2781	2729	2931	2982	2982

ORGIN/DEST	NPA	COF	NQX	NZY	NYL	SBD	LGB
BOS	1399	1333	1675	1674	2857	2967	3032
NCO	1367	1301	1642	3006	2830	2935	3000
GON	1312	1246	1587	2951	2766	2880	2945
DOV	1066	999	1340	2764	2582	2704	2769
WRI	1131	1069	1406	2784	2603	2713	2778
PHL	1104	1038	1379	2761	2580	2690	2755
IND	755	1015	1342	2106	1925	2035	2100
NGU	920	817	1148	2684	2502	2624	2679
NKT	828	693	1034	2652	2470	2592	2657
NHK	993	905	1246	2707	2525	2647	2712
DCA	973	900	1241	2671	2479	2611	2676
CHS	566	431	772	2434	2252	2408	2473
KBY	415	207	527	2315	2158	2331	2396
NIP	384	166	507	2356	2174	2338	2403
NPA	x	522	829	2016	1834	1998	2063
COF	522	x	362	2505	2323	2478	2552
NQX	829	362	x	2812	2630	2794	2859
NZY	2016	2505	2812	x	184	107	111
SBD	1998	2487	2794	107	221	x	74
LGB	2063	2552	2859	111	286	74	x
NTD	2106	2595	2902	614	329	113	70
SUU	2437	2920	3227	515	668	452	420
NLC	2244	2727	3034	322	475	259	227
NGZ	2416	2899	3206	487	632	424	392
PWT	2741	3130	3437	1259	1395	1174	1164
NUW	2787	3176	3483	1320	1456	1235	1225
ICM	2742	3131	3438	1220	1356	1135	1125

ORGIN/DEST	NTD	SUU	NLC	NGZ	PWT	NUW	TCM
BOS	3075	3084	3119	3115	2983	3030	2985
NCO	3043	3057	3092	3088	2993	3039	2994
GON	2988	3002	3037	3033	2938	2984	2938
DOV	2812	2867	2888	2898	2809	2855	2810
WRI	2821	2866	2897	2897	2808	2854	2809
PHL	2798	2843	2874	3874	2785	2831	2786
IND	2143	2236	2219	2267	2215	2261	2216
NGU	2732	2931	2798	2962	2906	2949	2904
NKT	2700	2969	2776	2948	2964	3010	2965
NHK	2755	2838	2831	2869	2780	2826	2781
DCA	2719	2786	2795	2871	2782	2774	2729
CHS	2516	2785	2592	2764	2930	2976	2931
KBY	2439	2738	2556	2728	2982	3020	2982
NIP	2446	2771	2578	2750	2981	3027	2982
NPA	2106	4237	2244	2416	2714	2787	2742
COF	2595	2920	2727	2899	3130	3176	3131
NQX	2902	3227	3034	3206	3437	3483	3438
NZY	614	515	322	487	1259	1320	1220
SBD	113	452	259	424	1174	1235	1135
LGB	70	420	227	392	1164	1225	1125
NTD	x	156	224	377	1161	1222	1122
SUU	156	x	215	47	776	845	737
NLC	224	215	x	187	961	1022	922
NGZ	377	47	187	x	907	868	768
PWT	1161	776	961	807	x	84	41
NUW	1222	668	1022	868	84	x	108
TCM	1122	737	922	768	41	108	x

SOURCE: Official Table of Distances, NAVSO P-2471 (Rev 1-82)

NOTE: All units are in miles.

APPENDIX M

DAILY FREQUENCY OF CARGO MOVEMENT BETWEEN O-D PAIRS

Direct Air Terminal to Air Terminal

O/D	DOV	NGU	IND	CHS	NIP	NPA	NZY	SUU	TMC
DOV	X	7	3	4	4	4	7	7	x
NGU	7	x	3	5	5	4	7	7	x
IND	x	3	x	3	3	x	3	3	x
CHS	7	7	x	x	5	4	4	4	x
NIP	7	7	x	7	x	4	4	4	x
NPA	4	4	x	4	4	x	4	4	x
NZY	4	7	3	7	7	4	x	7	x
SUU	4	7	3	7	7	4	7	x	4
TMC	x	x	x	x	x	x	x	4	x

Direct truck operations between O-D pairs

* indicates main air terminals

O/D	*DOV	GON	NCO	BOS	PHI	WRI
DOV*	x	5	5	5	5	5
GON	5	x	5	5	5	5
NCO	5	5	x	5	5	5
BOS	5	5	5	x	5	5
PHI	5	5	5	5	x	5
WRI	5	5	5	5	5	x

O/D	*NGU	NKT	NHK	DCA
NGU*	x	6	5	5
NKT	6	X	5	5
NHK	5	5	X	5
DCA	5	5	5	X

O/D	*CHS	KBY
CHS*	x	1
KBY	1	x

O/D	*NIP	COF	NQX	NPA
NIP*	x	5	5	5
COF	5	x	5	5
NQX	5	5	x	5
NPA	5	5	5	x

O/D	*NZY	SBD	LGB	NTD	NGZ	SUU	NYL
NZY*	x	6	5	5	5	5	5
SBD	6	x	5	5	5	5	5
LGB	5	5	x	5	5	5	5
NTD	5	5	5	x	5	5	5
NGZ	5	5	5	5	x	5	5
SUU	5	5	5	5	5	x	5
NYL	5	5	5	5	5	5	x

O/D	*SUU	NGZ	NLC	LGB	NZY
SUU*	x	7	5	5	5
NGZ	7	x	5	5	5
NLC	5	5	x	5	5
LBG	5	5	5	x	5
NZY	5	5	5	5	x

C/D	*TMC	PWT	NUM
TMC*	x	5	5
PWT	5	x	5
NUM	5	5	x

APPENDIX N

AVERAGE WEIGHT SHIPPED PER DAY

O/D	BCS	NCC	GON	DOV	WRI	PHL	IND	NGU
EOS	x	18.2	500.0	63.6	x	36.4	63.6	1500.0
NCO	27.3	x	136.6	72.7	x	9.1	18.2	481.8
GON	645.5	45.5	x	163.6	x	90.9	63.6	1872.7
DOV	263.6	36.4	290.9	x	54.5	381.8	181.8	5609.1
WRI	45.5	x	x	90.9	x	136.6	x	545.5
PHL	236.4	36.4	127.3	572.7	18.3	x	36.4	2063.6
IND	118.2	x	27.3	127.3	9.1	54.5	x	1690.9
NGU	2181.8	709.1	3145.5	6018.2	1154.5	2236.4	718.2	x
NKT	172.7	x	100.0	436.4	27.3	63.6	100.0	4645.5
NHK	118.2	x	27.3	227.3	45.5	72.7	54.5	2972.7
DCA	x	x	54.5	118.2	45.5	18.3	45.5	1145.5
CHS	2427.3	354.5	1590.9	936.4	36.4	600.0	727.3	10581.8
KBY	x	x	x	x	x	x	x	x
NIP	600.0	27.3	54.5	1790.9	81.8	490.9	418.1	7536.4
NPA	127.3	18.3	200.0	209.1	100.0	190.9	45.5	3936.4
COF	36.4	9.1	45.5	36.4	x	x	18.3	118.2
NQX	9.1	x	9.1	9.1	9.1	9.1	9.1	381.8
NZY	409.1	200.0	463.6	1081.8	90.9	427.3	881.8	7127.3
NYL	x	x	x	x	x	x	x	x
SBD	81.8	x	x	x	x	x	27.3	18.3
LGB	90.9	54.5	63.6	127.3	x	100.0	127.3	1427.3
NTD	x	18.3	x	x	x	490.9	54.5	972.7
SUU	1281.8	109.1	636.4	1790.9	163.6	718.2	618.2	8445.5
NLC	63.6	x	x	x	9.1	x	18.3	390.9
NGZ	336.4	54.5	118.2	327.3	27.3	718.2	109.1	2227.3
PWT	181.8	81.8	309.1	181.8	9.1	136.6	90.9	600.0
NUW	x	x	9.1	172.7	18.3	9.1	236.4	654.5
TCM	154.5	118.2	245.5	181.8	x	145.5	27.3	681.8
TOT	9609.2	1891.2	8154.9	14736.	1900.3	7137.0	4691.2	67827.5

*All weight is in pounds

O/D	NKT	NHK	DCA	CHS	KBY	NIP	NPA	COF
EOS	172.7	36.4	9.1	2409.1	109.1	181.8	36.4	18.3
NCO	18.3	x	27.3	245.5	x	9.1	36.4	18.3
GON	9.1	9.1	109.1	672.7	81.8	300.0	27.3	90.9
DOV	790.9	254.5	145.5	2218.2	54.5	763.6	245.5	18.3
WRI	109.1	81.8	36.4	18.3	x	163.6	118.2	x
PHL	127.3	45.5	81.8	836.4	54.5	972.7	127.3	x
IND	136.6	81.8	45.5	691.8	9.1	118.2	45.5	36.4
NGU	6209.1	2254.5	2645.5	15854.5	863.6	12481.8	3636.4	390.9
NKT	x	445.5	290.9	127.3	x	881.8	663.6	27.3
NHK	681.8	x	x	300.0	9.1	572.7	281.8	x
DCA	790.9	x	x	1654.5	18.3	18.3	54.5	x
CHS	218.2	190.9	363.6	x	x	1454.5	881.8	827.3
KBY	x	x	x	x	x	x	x	x
NIP	1109.1	600.0	100.0	709.1	27.3	x	5300.0	x
NPA	1090.9	336.4	81.8	781.8	x	2790.9	x	136.6
COF	81.8	x	18.3	118.2	x	254.5	36.4	x
NQX	172.7	18.3	x	9.1	9.1	863.6	163.6	81.8
NZY	1645.5	281.8	509.1	1900.0	36.4	1754.5	1763.6	272.7
NYL	x	x	x	x	x	x	x	x
SBD	18.3	9.1	x	x	x	18.3	27.3	x
LGB	427.3	109.1	72.7	518.2	9.1	236.4	381.8	9.1
NTD	63.6	36.4	18.3	54.5	9.1	90.9	54.5	x
SUU	1490.9	563.6	645.5	2445.5	54.5	3045.5	1163.6	54.5
NLC	36.4	45.5	9.1	18.3	x	563.6	36.4	18.3
NGZ	181.8	100.0	109.1	972.7	18.3	418.1	172.7	45.5
PWT	x	9.1	81.8	372.7	x	27.3	18.3	18.3
NUW	109.1	45.5	9.1	x	x	1481.8	72.7	x
TCM	9.1	18.3	109.1	1272.7	18.3	154.5	100.0	109.1
TOT	15700.	5573.1	5518.6	34201.1	1382.	29618.0	15445.	2173.6

O/D	NQX	NZY	NYL	SBD	LGB	NTD	SUU	NLC
EOS	9.1	236.4	x	x	200.0	x	927.3	x
NCO	x	127.3	x	x	45.5	x	145.5	x
GON	x	172.7	x	x	63.6	9.1	290.9	x
DOV	36.4	800.0	x	90.9	345.5	27.3	1954.5	x
WRI	9.1	190.9	x	18.3	54.5	9.1	236.4	36.4
PHL	9.1	763.6	x	27.3	372.7	100.0	863.4	36.4
IND	27.3	809.1	x	36.4	272.7	72.7	772.7	54.5
NGU	918.2	11118.2	x	600.0	3845.5	1354.5	9763.6	418.1
NKT	136.6	2409.1	x	363.6	927.3	100.0	1681.8	54.5
NHK	54.5	609.1	x	x	227.3	190.9	645.5	63.6
DCA	45.5	118.2	x	63.6	36.4	45.5	709.1	x
CHS	90.9	1409.1	x	81.8	1036.4	118.2	2227.3	x
KBY	x	x	x	x	x	x	x	x
NIP	863.4	1472.7	x	27.3	736.4	272.7	2545.5	727.3
NPA	245.5	1763.6	x	227.3	600.0	72.7	1745.5	100.0
COF	9.1	27.3	x	x	81.8	18.3	54.5	x
NQX	x	27.3	x	x	36.4	18.3	36.4	x
NZY	127.3	x	1836.	2918.2	2063.6	1190.9	12545.5	1418.2
NYL	x	x	x	x	x	x	x	x
SBD	x	4045.5	x	x	281.8	345.5	127.7	x
LGB	9.1	1700.0	x	236.4	x	154.5	1136.4	136.6
NTD	18.3	1545.5	x	409.1	200.0	x	1727.3	381.8
SUU	218.2	11300.	x	436.4	1881.8	400.0	x	890.9
NLC	x	600.0	x	x	54.5	45.5	718.2	x
NGZ	36.4	5754.5	x	309.1	3781.8	209.1	54.5	x
PWT	27.3	1290.9	x	x	563.6	45.5	4472.7	9.1
NUW	x	536.4	x	18.3	90.9	27.3	1827.3	27.3
ICM	9.1	1736.4	x	218.2	390.9	136.6	4827.3	54.5
TOT	2900.4	50563.	1836.	6082.2	18190.	4964.2	52036.8	4409.2

O/D	NGZ	PWT	NUW	TCM	TOTAL
BOS	90.9	554.5	x	327.3	7500.2
NCO	36.4	54.5	x	81.8	1591.6
GON	136.6	54.5	x	400.0	5309.2
DOV	209.1	209.1	172.7	727.3	15881.9
WRI	18.3	100.0	9.1	36.4	2064.4
PHL	90.9	300.0	27.3	227.3	8154.6
IND	154.5	45.5	245.5	181.8	5864.9
NGU	936.4	2227.3	527.3	2572.7	94781.8
NKT	27.3	x	72.7	390.9	14145.7
NHK	9.1	36.4	54.5	172.7	7427.2
DCA	27.3	18.3	x	145.5	5173.4
CHS	309.1	500.0	18.3	1218.2	28200.2
KBY	x	x	x	x	x
NIP	72.7	127.3	1054.5	318.2	27063.4
NPA	45.5	45.5	154.5	272.7	15318.7
COF	9.1	72.7	x	90.9	1136.8
NQX	x	9.1	x	x	1882.1
NZY	3172.7	2718.2	827.3	4218.2	51881.9
NYL	x	x	x	x	x
SBD	36.4	9.1	x	9.1	5055.5
LGB	981.8	236.4	100.0	627.3	9073.1
NTD	118.2	54.5	18.3	318.2	6654.9
SUU	2700.0	2136.4	1609.1	10127.3	54927.4
NLC	x	x	18.3	145.5	2791.5
NGZ	x	2081.8	281.8	3081.8	21527.3
PWT	1845.5	x	1718.2	572.7	12664.1
NUW	100.0	81.8	x	300.0	5829.6
TCM	1363.6	490.9	300.0	x	13073.2
TOT	12491.4	12163.8	7209.4	26463.8	424972.6

APPENDIX O

AVERAGE COST PER DAILY SHIPMENT

O/D	BCS	NCO	GCN	DOV	WRI	PHL	IND	NGU
EOS	x	38	365	67	x	52	67	1005
NCO	45	x	126	75	x	29	38	424
GON	471	59	x	151	x	100	67	1442
DOV	206	52	227	x	64	290	193	3478
WRI	59	x	x	100	x	126	x	398
PHL	184	52	117	418	38	x	52	1321
IND	135	x	45	117	29	64	x	1302
NGU	1462	610	2359	3731	774	1431	618	x
NKT	159	x	106	332	45	67	106	2973
NHK	109	x	45	177	59	75	64	1903
DCA	x	x	64	109	59	38	59	767
CHS	2087	362	1416	927	52	594	720	8889
KBY	x	x	x	x	x	x	x	x
NIP	594	45	64	1594	88	501	426	6331
NPA	197	38	270	282	155	296	59	4409
COF	52	29	59	52	x	x	38	125
NQX	29	x	29	29	29	29	29	389
NZY	483	242	547	1114	100	504	1014	6913
NYL	x	x	x	x	x	x	x	x
SBD	88	x	x	x	x	x	45	38
LGB	100	64	67	177	x	139	177	1470
NTD	x	38	x	x	x	648	64	1245
SUU	1320	152	732	1845	227	826	711	8192
NLC	67	x	x	x	29	x	38	516
NGZ	397	64	155	386	45	826	152	2495
FWT	253	88	365	219	29	190	100	768
NUW	x	x	29	209	38	29	286	838
TCM	215	164	297	210	x	202	45	1129
TOT	8712	2097	7484	12321	1860	7056	5168	58760

*All amounts are in dollars

O/D	NKT	NHK	DCA	CHS	KBY	NIP	NPA	COF
EOS	159	52	29	2072	132	220	52	38
NCO	38	x	45	258	x	29	52	38
GON	29	29	100	666	88	306	45	100
DOV	577	234	154	1664	64	756	331	38
WRI	100	88	52	38	x	197	183	x
PHL	117	59	88	719	64	963	197	x
IND	145	88	59	675	29	143	59	51
NGU	3850	1443	1693	13318	855	10485	4073	344
NKT	x	339	267	154	x	873	657	45
NHK	498	x	x	306	29	567	380	x
DCA	577	x	x	1473	38	38	64	x
CHS	229	231	371	x	x	1295	873	819
KBY	x	x	x	x	x	x	x	x
NIP	987	594	121	702	45	x	4452	x
NPA	971	444	88	774	x	2400	x	165
COF	88	x	38	143	x	232	52	x
NQX	209	38	x	29	29	743	198	88
NZY	1695	341	585	2185	52	2018	2469	330
NYL	x	x	x	x	x	x	x	x
SBD	38	29	x	x	x	38	45	x
LGB	504	152	75	596	29	286	615	29
NTD	67	51	38	64	29	100	64	x
SUU	1536	648	742	2446	64	3046	1338	64
NLC	52	59	29	38	x	721	52	38
NGZ	260	139	152	1119	38	493	268	59
PWT	x	29	88	492	x	45	38	38
NUW	152	59	29	x	x	1704	75	x
TCM	29	38	152	1464	38	235	187	152
TOT	12907	5184	4995	31395	1623	27933	16819	2436

O/D	NQX	NZY	NYL	SBD	LGB	NTD	SUU	NLC
BOS	29	286	x	x	278	x	1066	x
NCO	x	177	x	x	59	x	202	x
GON	x	268	x	x	67	29	393	x
COV	52	920	x	100	408	45	2013	x
WRI	29	265	x	38	64	29	286	52
PHL	29	878	x	45	440	155	993	52
IND	45	930	x	52	330	75	889	64
NGU	909	10785	x	690	3846	1558	9471	552
NKT	165	2409	x	429	1066	155	1732	64
NHK	64	700	x	x	275	296	752	67
DCA	59	155	x	67	52	59	815	x
CHS	100	1620	x	88	1192	221	2495	x
KBY	x	x	x	x	x	x	x	x
NIP	742	1694	x	45	942	453	2851	931
NPA	258	2469	x	377	942	75	2444	187
COF	29	45	x	x	88	38	64	x
NQX	x	45	x	x	52	38	52	x
NZY	177	x	1230	1868	1321	917	7778	1092
NYL	x	x	x	x	x	x	x	x
SBD	x	2589	x	x	220	269	159	x
LGB	29	1139	x	184	x	142	761	126
NTD	38	1190	x	298	156	x	1330	336
SUU	362	7006	x	332	1261	352	x	650
NLC	x	438	x	x	64	59	524	x
NGZ	52	3568	x	315	2420	190	64	x
PWT	45	1149	x	x	558	59	3355	29
NUW	x	531	x	38	100	45	1407	45
TCM	29	1545	x	229	339	190	3620	64
TOT	3242	42801	1230	5195	16600	5449	45516	4311

C/D	NGZ	PWT	NUW	TCM	TOTAL
BOS	100	638	x	386	7131
NCO	52	64	x	88	1839
GON	212	64	x	472	5158
DOV	253	253	240	836	13448
WRI	38	139	29	52	2362
PHL	100	354	45	275	7755
IND	215	59	297	253	6150
NGU	1077	2227	606	2573	81340
NKT	45	x	75	461	12724
NHK	29	52	64	240	6751
DCA	45	38	x	202	4778
CHS	408	640	38	1401	27068
KBY	x	x	x	x	x
NIP	75	197	1213	420	26107
NAP	59	59	289	453	18160
COF	29	75	x	100	1376
NQX	x	29	x	x	2113
NZY	2031	2338	819	3628	43791
NYL	x	x	x	x	x
SBD	51	29	x	29	3667
LGB	717	248	121	621	8568
NTD	125	64	38	375	6358
SUU	1674	1367	1078	6279	44250
NLC	x	x	38	202	2964
NGZ	x	1332	220	1972	17181
PWT	1421	x	1151	418	10927
NUW	106	88	x	228	6036
TCM	1050	432	228	x	12343
TOT	9912	10786	6589	21964	380345

APPENDIX P

NEW DEDICATED TRUCK ROUTES

Origin	Destination	Miles	Trips per month	Annual Cost#
NGU via DCA*	DOV	100	22	$34,584
DOV via DCA*	NGU	100	22	$34,584
NGU	CHS	418	22	$144,672
CHS	NGU	418	22	$144,672
CHS	NIP	278	22	$96,096
NIP	CHS	278	22	$96,096
Total				$550,704
Possible additional truck routes required				
NZY	SUU	515	22	$200,376**
Total				$751,080

* Cost of NGU to DCA included in current trucking cost

# Cost is based on $1.31 per mile

** Cost is based upon actual standing route order cost of $759 per round-trip

APPENDIX Q

REVISED AVERAGE COST PER DAILY SHIPMENT

O/D	BOS	NCO	GON	DOV	WRI	PHL	IND	NGU
BOS	x	CT	CT	CT	x	CT	67	1005
NCO	CT	x	CT	CT	x	CT	38	424
GON	CT	CT	x	CT	x	CT	67	PT
DOV	CT	CT	CT	x	CT	CT	193	PT
WRI	CT	x	x	CT	x	CT	x	PT
PHL	CT	CT	CT	CT	CT	x	52	PT
IND	135	x	45	117	29	64	x	1302
NGU	1462	610	PT	PT	PT	PT	618	x
NKT	159	x	106	PT	PT	PT	106	CT
NHK	PT	x	PT	PT	PT	PT	64	CT
DCA	x	x	PT	PT	PT	PT	59	CT
CHS	2087	362	1416	927	52	594	720	PT
KBY	x	x	x	x	x	x	x	x
NIP	594	45	64	1594	88	501	426	6331
NPA	197	38	270	282	155	296	59	4409
COF	52	29	59	52	x	x	38	125
NQX	29	x	29	29	29	29	29	389
NZY	483	242	547	1114	100	504	1014	6913
NYL	x	x	x	x	x	x	x	x
SBD	88	x	x	x	x	x	45	38
LGB	100	64	67	177	x	139	177	1470
NTD	x	38	x	x	x	648	64	1245
SUU	1320	152	732	1845	227	826	711	8192
NLC	67	x	x	x	29	x	38	516
NGZ	397	64	155	386	45	826	152	2495
PWT	253	88	365	219	29	190	100	768
NUW	x	x	29	209	38	29	286	838
TCM	215	164	297	210	x	202	45	1129
TOT	7638	1896	4181	7161	821	4848	5168	37589

*All amounts are in dollars

O/D	NKT	NHK	DCA	CHS	KBY	NIP	NPA	COF
BOS	159	PT	PT	2072	132	220	52	38
NCO	38	x	PT	258	x	29	52	38
GON	29	PT	PT	666	88	306	45	100
DOV	PT	PT	PT	1664	64	756	331	38
WRI	PT	PT	PT	38	x	197	183	x
PHL	PT	PT	PT	719	64	963	197	x
IND	145	88	59	675	29	143	59	51
NGU	CT	CT	CT	PT	855	10485	4073	344
NKT	x	CT	CT	PT	x	873	657	45
NHK	CT	x	CT	306	29	567	380	x
DCA	CT	x	x	1473	38	38	64	x
CHS	229	231	371	x	x	PT	873	PT
KBY	x	x	x	x	x	x	x	x
NIP	987	594	121	PT	T	x	CT	x
NPA	971	444	88	774	x	CT	x	165
COF	88	x	38	PT	x	CT	52	x
NQX	209	38	x	29	29	743	198	CT
NZY	1695	341	585	2185	52	2018	2469	330
NYL	x	x	x	x	x	x	x	x
SBD	38	29	x	x	x	38	45	x
LGB	504	152	75	596	29	286	615	29
NTD	67	51	38	64	29	100	64	x
SUU	1536	648	742	2446	64	3046	1338	64
NLC	52	59	29	38	x	721	52	38
NGZ	260	139	152	1119	38	493	268	59
PWT	x	29	88	492	x	45	38	38
NUW	152	59	29	x	x	1704	75	x
TCM	29	38	152	1464	38	235	187	152
TOT	6959	2940	2567	17078	1578	24006	12367	1529

O/D	NQX	NZY	NYL	SBD	LGB	NTD	SUU	NLC
BOS	29	286	x	x	278	x	1066	x
NCO	x	177	x	x	59	x	202	x
GON	x	268	x	x	67	29	393	x
DOV	52	920	x	100	408	45	2013	x
WRI	29	265	x	38	64	29	286	52
PHL	29	878	x	45	440	155	993	52
IND	45	930	x	52	330	75	889	64
NGU	909	10785	x	690	3846	1558	9471	552
NKT	165	2409	x	429	1066	155	1732	64
NHK	64	700	x	x	275	296	752	67
DCA	59	155	x	67	52	59	815	x
CHS	100	1620	x	88	1192	221	2495	x
KBY	x	x	x	x	x	x	x	x
NIP	742	1694	x	45	942	453	2851	931
NPA	258	2469	x	377	942	75	2444	187
COF	PT	45	x	x	88	38	64	x
NQX	x	45	x	x	52	38	52	x
NZY	177	x	CT	CT	CT	CT	CT	CT
NYL	x	x	x	x	x	x	x	x
SBD	x	CT	x	x	CT	CT	CT	x
LGB	29	CT	x	CT	x	CT	CT	CT
NTD	38	1190	x	CT	CT	x	CT	CT
SUU	362	CT	x	CT	CT	CT	x	CT
NLC	x	CT	x	x	CT	CT	CT	x
NGZ	52	CT	x	CT	CT	CT	CT	x
PWT	45	1149	x	x	558	59	3355	29
NUW	x	531	x	38	100	45	1407	45
TCM	29	1545	x	229	339	190	3620	54
TOT	3213	28061	0	2198	11098	3520	34900	2097

O/D	NGZ	PWT	NUW	TCM	TOTAL
BOS	100	638	x	386	6528
NCO	52	64	x	88	1519
GON	212	64	x	472	2806
DOV	253	253	240	836	8166
WRI	38	139	29	52	1439
PHL	100	354	45	275	5361
IND	215	59	297	253	6150
NGU	1077	2227	606	2573	52741
NKT	45	x	75	461	8547
NHK	29	52	64	240	3885
DCA	45	38	x	202	3164
CHS	408	640	38	1401	15836
KBY	x	x	x	x	x
NIP	75	197	1213	420	20908
NPA	59	59	289	453	15760
COF	29	75	x	100	972
NQX	x	29	x	x	2025
NZY	CT	2338	819	3628	27554
NYL	x	x	x	x	x
SBD	CT	29	x	29	379
LGB	CT	248	121	621	5499
NTD	CT	64	38	375	4113
SUU	CT	1367	1078	6279	32975
NLC	x	x	38	202	1879
NGZ	x	1332	220	1972	10624
PWT	1421	x	CT	CT	9358
NUW	106	CT	x	CT	5720
TCM	1050	CT	CT	x	11613
TOT	5314	10266	5210	21318	265521

CT = Current dedicated truck system
PT = Proposed additional dedicated truck routes

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